Evaluation and improvement of water quality models
for application to temporary waters
in Southern European catchments

tempQsim

Third Management Report

Period covered: 01.11.2003 – 30.04.2004

Section 1: Management and resource usage summary

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0 Summary of the tempQsim project

0.1 Problems to be solved

There are currently very major problems in the application of existing water quality models to the Mediterranean during *periods without runoff* (including numerical problems for most of the models) and the extreme *first flush effects* at the beginning of the rain period. The dynamic processes in sediments during the period of no surface runoff and the interaction of re-suspended matter and water quality are often not considered. To meet the aim of the project, the particular **water quality dynamics of temporary waters** will be incorporated into existing catchment and in-stream water quality models.

0.2 General objectives of the tempQsim project

The aim of the project tempQsim is to provide advanced tools that will significantly improve the efficiency of integrated water management in the Mediterranean and semiarid river catchments. In these regions rivers are dry for part of the year. These rivers are described as temporary waters.

0.3 Expected Impact

In the Mediterranean countries of the EU, about 180 million inhabitants are affected by low water flows. Particularly for Member States facing recurrent and increased shortages alternating with periods of flood, the availability of suitable tools for the assessment and management of water resources is of great importance. This project clearly adopts this objective since it is aimed at promoting a more efficient river basin management in *semi-arid* regions of the EU, where water resources both are reduced and irregularly distributed in space and time and therefore *of high value.*

0.3.1 Economy and availability of natural water resources

Increase economical development requires the matching of water demands to the availability of the resource. This requires models that can predict the availability of water resources and their impairment by water pollution. The project is to improve models, along with supporting tools and data to improve the economical development.

0.3.2 Quality of life, health

Quality of life in rural areas of the Mediterranean will be increased by the project with the help of tools, which will support management decisions towards a sustainable economical development (s. above). TempQsim will be useful to prevent or minimise the distribution of heavy metals, pesticides and herbicides through a better understanding of temporal flow dynamics and pollution pathways.

0.3.3 Quality of environment

The development of a common data base of relevant abiotic data (e.g. hydrology and dissolved substances) and data on microbiological turnover rates will support ecologists in relating taxonomical data of macrozoobenthos and mesofaunal populations and biodiversity data to the hydro-period of temporary waters. As these data will be available over a range of habitat and water types-from alpine rivers to flood plains, they will be useful in investigating ecological differences between different stream types.

1 Objectives of the reporting period

The project commencement date was November 1st 2002.

During the third reporting period the objectives were to continue to investigate first water flood period and to analyse samples laboratory data, and results.

The Mid-term Review was held in Capoterra/Cagliari, from 23 to 26 March 2004. In the workshop scientific representatives of all project partner and the two external project reviewers participated. The meeting was used to strengthen the collaboration between the participants and to clarify next work steps and short term objectives and tasks distribution. The outcomes of the meeting are given in the Appendix.

2 Scientific/Technical progress made in different work packages according to the planned time schedule

The following section gives an overview on the scientific/technical progress made in the workpackages 1 to 5 including the contributions of the 16 partners. At the end of the section the updated Gantt chart is presented. The table with comparison between planned and used manpower and financial resources by workpackages and partner will be presented in the Annex.

2.1 Work package 1: Project-organisation

UHANN (P1)

The administrative management during the reporting period covered financial issues, preparation of the TIP, meeting minutes, and the process of signing the Contract Amendment No 1.

A major part related to the project organisation was dedicated to the editing of the 1st annual report containing the acquisition of partner contributions, revisions and editing of the final version. The first annual report was comparatively extensive in order to provide consortium members with more detailed information about the progress and obstacles.

UHANN spend also some significant effort in calculation of the budget allocation for the second payment in close agreement with the EC officer in charge.

The co-ordination of project activities with the European Commission was part of the UHANN work. Amongst others, the scientific officer has been changed during the reporting period. Both the new officer and consortium members were provided with the required information by UHANN.

The tempQsim project was represented by the UHANN staff on the Harmoni-CA conference in Brussels (16th to 19th February 2004). This was used to revise the modelling approach (model complexity) and to discuss the overall expectations from endusers responsible for the implementation of the EU Water Framework directive. TempQsim was also represented at an internal organisation meeting of CatchMod partners at IRSA (Rome) to identify ways to extend and enrich future collaboration.

UHANN has contributed to the preparation of the project meetings in Brussels, February 2004, (WP2-Modelling workshop) and Cagliari, March 2004, (Midterm review) in co-operation with partner 6 (IRSA) and partner 11 (HyC).

The preparation of the mid-term review entailed close co-ordination with the EC regarding the choice of relevant experts, the collection and distribution of the necessary information documents.

Furthermore the work of WP1 includes the maintenance of the project homepage (www.tempqsim.net) and the further completion of the project database. The data contributions of the project partners are still not fully satisfactory and will require a number of manual revisions and transformations. UHANN will continue to remind the participants to provide the data, and so facilitate a smoother information exchange across the catchments. In the meantime UHANN is contributing to the development of import scripts and web-based queries.

NERC (P2)

NERC has attended all regular meetings in the reporting period.

TUC (P3)

TUC has organised and hosted a specific HSPF meeting in Chania (16th to 23rd January):

- Collaboration with Ass. Professor Irina (UACEG) for HSPF application – Participation of UACEG team member to HSPF training workshop in Chania.
- Collaboration with Dr. Ing. Jochen Froebrich (Co-ordinator) (UHANN) for HSPF application – Participation of UHANN team member to HSPF training workshop in Chania.

Participation of Nikolaos Nikolaidis to WP2 meeting in Brussels: Presentation of model activities by the TUC team.

Participation by Nikolaos Nikolaidis and Rania Tzoraki to the 3rd project meeting in Cagliari: Presentation of TUC activities.

EAWAG (P4)

EAWAG attended the tempQsim meeting in Cagliari, Italy (March 2004). There, a separate 1-day WP4 workshop was held. During this workshop the experimental design of bed-sediment processes was discussed and agreed upon.

Partners of IRSA visited EAWAG to discuss methodological questions on bed-sediment processes (experimental strategy, microbiological analysis).

A NERC-proposal has been successfully submitted (together with Dr. Mark Lorang, Univ. Montana, Prof. Geoffrey Petts, Birmingham, Prof. Angela Gurnell, King's College London). The aim of the project is to link hyperspectral images with ground-truth methods in order to identify aquatic and terrestrial habitats along the Tagliamento corridor. The project supplements the tempQsim project (WPs 3 & 4).

IMAR (P5)

IMAR took part in Modelling-Group Meeting in Brussels and it was important for discuss limitations on the selected models and how they should be modified.

IMAR researchers attended to the mid-term Meeting in Sardinia.

IMAR provided to UHANN available and historical data from Degebe watershed to archive in tempQsim database.

IRSA (P6)

IRSA researchers attended the 3rd all-partners meeting in Cagliari, Italy. IRSA also took part to the Modelling-group meeting held in Brussels where the current achievements of the modelling groups were examined and first insight on models' features and efficiency has been carried out.

Also several meetings where held in Rome to jointly discuss within all the Italian researchers (IRSA and Hydrocontrol) involved all the aspects related to the links between the modellers' prospective and job and biologists' ones (IRSA is the only Institute in the partnership in which modellers, hydrologists and sediment microbiologists are jointly involved in the project).

An informal meeting was held in Rome in January between the project leader and the WP2 leader to discuss aspects.

IRSA researcher attended a meeting at EAWAG to discuss experimental strategies within the WP4.

CSIC (P7)

The database has been uploaded with data from Vallcebre and new and corrected rain data from El Albujon watershed.

The CSIC team attended the midterm meeting in Sardinia.

Partner 12 (UESSEN) visited the Albujon watershed in February 2004. A co-ordinated working survey was carried out. Some cross profiles, previously used by CSIC in the continuous water-sampling, were used by Partner 12 for bed sediments sampling to be analysed for chemicals.

MSEM (P8)

MSEM team took part in Modelling-Group Meeting in Brussels (February 2004) to discuss the tempQsim modelling strategy and in the mid-term tempQsim meeting in Cagliari, Italy (March 2004).

MSEM team visited the Mulargia catchment during 2 extra days to prepare the hydrological modelling works in this catchment, using the MSEM model (MERCEDES).

MSEM team prepared and uploaded the data to populate the tempQsim database.

UACEG (P9)

Comparing the work for the reported and the previous period (first year report), the following organisational activities, continued to be carried out:

- Everyday co-ordination of the work of the two sub-groups of the Bulgarian team ("modellers" and "field workers");
- Exchange of information with other foreign partners through e-mails;
- Close collaboration with TUC partner, who supervises testing of HSPF model for the Bulgarian catchment;
- Web based communication, realised through participation in the established tempQsim forums.

The new organisational activities for the reported period were:

- Participation in the meeting of the modelling group in Brussels;
- Participation in the third co-ordination meeting in Sardinia;
- Preparing and uploading the necessary files for Iskar site in the central data base;

NCMR (P10)

Co-operation with local authorities: Information of the Municipality on the project progress.

Collaboration with other partners:

TUC: steady communication (experience and literature exchange, planning of re-search and field activities, collaboration for the comprehensive field campaign, which took place in November, etc.). NCMR sends regularly to TUC field data and meteorological data from national Agencies for the modelling purposes. In March, N. Skoulikidis and Y. Amaxidis visited TUC in order to analyse the data set and prepare the presentation of Krathis catchment for the 3rd project meeting that took place in Sardinia.

UED: Y. Amaxidis started collaborating with Prof. W. Burghardt (University of Essen) for his PhD that will be carried out at the University of Essen. The PhD of Mr. Yorgos Amaxidis will focus on erosion, transfer and deposition of sediments, organic matter and nutrients in Krathis catchment. Prof. Burghardt with Y. Amaxidis visited the Krathis catchment between the end of March and the beginning of April. In the framework of field working activities, areas threatened from erosion have been detected, different soil types have been pin-pointed and soil/ water sampling from ~10 extra sites has been carried out.

JRC: Catchment related data have been sent to F. Bouraoui for running the ANSWERS model on Krathis.

EAWAG: Collaboration with M. Doering for image analysis of the air-photos (vertical projection technique)

IMAR: Collaboration with Dr. M. Morais for techniques concerning a) sampling for interstitial water and b) leave leaching experiments, which are available at IMAR.

HYC (P11)

HyC organised the tempQsim mid-term review meeting and the field trip in Cagliari, Italy in March 2004. The meeting was also hosted at HyC.

UED (P12)

UED attended the project mid-term meeting on Sardinia and contributed to the scientific exchange and the future project planning.

JRC (P16)

JRC attended the project mid-term meeting on Sardinia and contributed to the scientific exchange and the future project planning.

2.2 Work package 2: Assessment of models

UHANN (P1)

The contribution of UHANN to WP2 was in the organisation of available data and the analysis of their quality for the testing of the models HSPF and Cascade. For this purpose the data exchange between the partner NERC, TUC, MSEM and ULEEDS was continued.

Model runs with HSPF have been continued to check limitations of the model.

In order to harmonise the modelling with HSPF in the project Basins the workshop was attended. During this co-operation many problems could be solved jointly and enabled the participants to go into further detailed modelling.

Results of HSPF application have been presented on the modelling meeting in Brussels and on the Midterm review. Instead of previous conclusions, the run-off formation indicates a much greater degree of freedom and will require more detailed input information on real infiltration.

To strengthen the interaction between the model development teams, UHANN had decided to proceed with the improvement of the Cascade model together with NERC. Cascade has a number of advantages in comparison to the HSPF, which makes an extension of the sediment transport approaches useful.

NERC (P2)

CEH Wallingford has modelled the Degebe (Portugal) and Albujon (Spain) catchments using the CASCADE model. Modelling of the Vène is in progress.

Degebe – The catchment geometry for the Pardiela tributary has been set up, rainfall and spatial catchment characteristic data procured, and the CASCADE model run using historic rainfall. Additional bed sediment components were included in the CASCADE in-stream model to account for bed sediment phosphorus. No validation was possible at the time of modelling because of a lack of in-stream data. Data, which are believed to be suitable, have now been made available, together with a DEM extended downstream to a flow-gauging site. A priority is to rerun the CASCADE model on the Degebe using these data.

Albujon – The CASCADE model has been run at two scales. Detailed data were made avail-able by the catchment owners at a number of downstream sites where there was permanent water flow. These were sufficient to apply the in-stream component of the CASCADE model, with some validation, to a 2km stretch of the river. At catchment scale, the CASCADE geometry was set up and the model run for the year 2000. There were insufficient data to validate the model.

Modelling on the Albujon will resume once recently measured flow and water quality data have been made available by the catchment owners.

Vène – Unlike the Albujon and Degebe, the Vène has a substantial historic record of in-stream measurements. It was therefore decided during the spring of 2004 to model the Vène using CASCADE. To this end, Dr Cooper has visited the Vène catchment, and a transfer of data has been agreed so that modelling the Vène can commence.

TUC (P3)

The methodology applied for testing the HSPF model will be performed in three steps:

- Evaluation of the existing model for proper application in Krathis catchment. This phase involves HSPF simulation of Krathis river and evaluation of the appropriateness of the existing parameterisation
- Implementation of the tempQsim module in HSPF
- Evaluation of model simulation improvement due to the new parameterisation

The TUC team has been working on the first of the three steps of the methodology. Since continues sampling of Krathis started a year ago and there aren't enough hydrologic and geo-chemical data from Krathis basin to calibrate the HSPF model, a historical dataset (1965-66) was used to calibrate the model. The hydrologic simulation for the historical data covered only half of the watershed since the gauging station was mid-way the length of the river. The main problems of the historical simulations were the weaknesses of the real data. In general the overall quality of the 1965-66 precipitation and flow data was poor. However, the historical simulation indicated that given reliable hydrometeorological data, HSPF could capture the response of Krathis watershed. To overcome the reliability of the historical data, we used data collected as part of the tempQsim project by NCMR during November of 2003 and calibrated the model.

IMAR (P5)

During this period SWAT model was tested in Pardiela Basin and its extension to the whole Degebe basin is being done using data provided by the enduser (INAG).

Test runs were obtained and presented in Sardinian mid-term Meeting and Brussels Meeting.

At the moment SWAT is still in calibrating phase. Further calibrations will being processing when new water quality data were gathered and also using information to be collected near the users of the water stored in the local reservoirs (Monte Novo and Vigia).

The DTM watershed basin was expanded and new soils classification provide new scenarios. Sensitivity analysis will be also done to different cultures and agriculture practices.

IRSA (P6)

The IRSA team has completed in co-operation with Hydrocontrol the setup of the environmental database needed to run the SWAT model on the Mulargia catchment. Specific additions and/or changes regarded:

- the acquisition of more data from new meteo-stations need to avoid problems so far encountered in matching measured flow with rain gauges data (due to the stormy behaviour of rainfall in the concerned area);
- new land use maps and management information have been incorporated into the database;
- flow and quality data for wastewater treatment plant have been added;
- more measured flow and quality data have been gathered to allow better calibration/validation of the simulation;

These new data allowed coming to a successful simulation of the Mulargia catchment.

On the basis of such simulations a perceptual basin model was setup regarding the Mulargia catchment and discussed with Hydrocontrol and local endusers.

CSIC (P7)

The CSIC team attended the WP2 meeting in Brussels.

At Vallcebre, the main attention was paid to the tests with TOPMODEL with data from the Can Vila catchment for 1) the use of different kind of data in the calibration process, and 2) testing the uncertainty of predictions of baseflow contribution. The results obtained in (1) showed that the use of limited amounts of data on the depth to the water table, stream discharge during recession periods, and the extent of saturated areas, might provide a better calibration of the model than the common use of continuous discharge records. On the other hand, the results in (2) demonstrated that there was an excessive degree of uncertainty in the prediction of the contribution of baseflow when the model was calibrated with discharge data, whereas the use of measurements of the depth to the water table or the extent of saturated areas drastically reduced the uncertainty of baseflow predictions. Other results with the tests demonstrated that this version of TOPMODEL is adequate for simulating the hydrological functioning of Vallcebre (stream discharge, baseflow, water table, saturated areas) during wet periods, while the evapotranspiration submodel is too simplistic for obtaining a reasonable simulation of the hydrological functioning during the whole year. These results were presented at the TempQsim WP2 meeting in Brussels, and at the I EGU Assembly in Nice (2 poster presentations), and will be published in a scientific journal with the collaboration of K. Beven, Lancaster University.

The data from the experimental plot at El Carot (Vallcebre) were prepared for trials with EUROSEM using a Monte-Carlo method. This plot was selected because its simplicity was as-

sumed to allow a better test of the model parameters that the use of catchment data. Nevertheless, the model revealed to be too intricate for this application and some bugs of the model could not be overcome. For this reason KINEROS, an erosion model that is simpler than EUROSEM but has most of its advantages for this application (physically-based hydrology, event-based, output of hydrographs and sedigraphs...) was selected for further trials using the Monte-Carlo method. The source code was already implemented and the sensitivity analysis was performed. The next step is a Monte-Carlo exploration of the parameter space.

The existing data sets from Albujón catchment have been revised and furthermore, some detected errors have been corrected. Missing gaps have been interpolated and the data have been prepared for model testing.

Existing GUI program (Basins) to partially parameterise the model inputs, on the basis of GIS data, proved to be rather problematic. Thus, some scripts have been programmed to directly retrieve the GIS information from the GIS GRASS, calculate statistics and create subsets of HSPF inputs.

The hydrological part of HSPF model is being run on El Albujón watershed. At the moment, the model sensitivity to the initial soil moisture conditions has been evidenced. The model is being run both, in a lumped and in a distributed way with respect to the rain.

The uncalibrated results have shown very little correlation with measured flows, thus the calibration is now in process.

MSEM (P8)

MSEM team attended the WP2 meeting in Brussels (February 2004). MSEM team worked on the Vène catchment modelling and began to work on the Mulargia catchment.

Vène catchment: MSEM team applied ATHYS-POL model with encouraging results. Improvements in the hydrological model were needed and are in progress for a better understanding of river processes. The water quality model was shown to be unable to consider both dissolved and particulate chemical elements so that first flush flood processes in the riverbed can be simulated. MSEM team also applied SWAT model on the Vène catchment. SWAT daily time step was shown to be unrealistic for Vène catchment. Same conclusion was drawn for river processes that are not considered at the good time scale in SWAT model. All the results were shown in Brussels.

Mulargia catchment: MSEM team began to collaborate with HYC for testing ATHYS-POL package on Mulargia catchment. MSEM team spent two days in Sardinia, after the mid-term meeting for extra-discussion and agreement about the transfer of data. The application is in progress.

MSEM team, as catchment owner, transferred data and experience to NERC and ULEEDS partners who wanted to apply their own models on the Vène catchment.

UACEG (P9)

The team is testing HSPF model for Iskar subcatchment, as agreed in the first co-ordination meeting. The testing procedure consists of two steps: 1) testing of the water quantity (hydrological testing) and 2) testing of the water quality. The testing of the hydrological part of the model has already been done and reported in the workshop in Brussels. Calibration procedure is completed and a paper is preparing for a conference in Italy. The second stage, water quality testing has been doing and will be completed very soon.

NCMR (P10)

Catchment related data have been sent to Faycal Bouraoui (JRC-ISPRA) for running the ANSWERS model on Krathis.

The monthly aquatic quality and quantity data, data from the installed automatic gauging station, as well as updated meteorological data from national Agencies, are regularly delivered to TUC for the modelling requirements.

HYC (P11)

In this workpackage, Hydrocontrol staff is working in very close collaboration with IRSA, which is the responsible for applying SWAT model in the Sardinian test case.

A new version of land-use map in shapefile format (.shp) was obtained by the Territorial Planning Regional Board. This map was carried out in 1:25000 scale and released in 2003. The map was obtained by means of aerophotogrammetric surveys and satellite images. Each land-use class is identified by a numeric code according to Corine Land Cover coding.

Additional information were recollected by the Census of Agriculture of the year 2001; these information regard the type and size of breeding as well as the surface area occupied by the cultures of the farms in all the Municipalities of the studied watershed (Nurri, Mandas, Serri, Orroli).

For the years 2002 and 2003, some monthly chemical data (pH, total suspended solids, COD, BOD5, total Nitrogen, nitrate, ammonium, total phosphorus) of inflowing and outflowing wastewater from Nurri, Serri and Orroli Municipalities treatment plants were collected. These data will be useful during the next SWAT calibration activities.

Recent activity has focussed on hydrological calibrations carried out by CNR-IRSA, highlighting the necessity to include some other meteorological stations not yet considered because outside the basin. Collection of data will be completed in the next 2 or 3 months. At the same time Hydrocontrol has started to collect sub-daily meteorological data, extracting them from ASCII files provided by the end-user (EAF) loggers. With this aim, Hydrocontrol has developed a Visual Basic application to aggregate raw data at the required temporal scale (multiple of 15 minutes for rain, multiple of 60 minutes for temperature, global solar radiation, wind, humidity).

ULEEDS (P13)

Linkages between PESERA/CLINUM and CASCADE (PESCAS)

CASCADE is driven by rainfall, which is routed through a series of hydrological response units delivering water, sediment and nutrients to the channel element. By linking the two complementary models, PESERA/CLINUM and CASCADE, we propose to create, with CEH-Wallingford, a coarse scale model with a daily time step which can be used to make broad comparisons between test catchments and across Europe, offers explicit estimates of surface runoff, erosion and total C, N and P on a cell by cell basis which are considered to have a useful complementarity with the CEH CASCADE delivery model.

The PESCAS combined model addresses the longer time scales, and, for this purpose, is designed to operate with a daily time step, representing the aggregate response to each event. This approach is less demanding in computing resources than a continuous time model running through each event, and allows application in areas where there is not a high-resolution data time series. However, some provision needs to be made for the additional variability that arises from poor hydrograph resolution.

JRC (P16)

The work done the JRC focused on modelling the Greek catchment. The JRC has now at hand most of the data to perform the calibration of the water flow for the years 1965-1966. So far the DEM was processed in order to generate the mesh for the ANSWERS model. This work involved the derivation of the cell slope, flow direction, and delineation of the stream network. The work is now focused on producing a soil map based on the five points in which detailed textural informa-

tion is available. This step is important as each cell of the catchment must be assigned to a soil type before any additional calculation can be performed It is expected to have all modelling work for the flow prediction finalised by the end of June 2004.

2.3 Work package 3: Hydrology and Water Quality

UHANN (P1)

The contributions from UHANN to the WP3 during the reporting period have been focused on the revision of the first results from the study sites. It became evident, that the sites are facing quite different approaches, which have been caused by geographic particularities and by specific environmental problems. There is need for an increased effort to harmonise the sampling activities for the second “first flush” in autumn 2004. This was also confirmed during the Midterm review and will be agreed with ULEEDS.

TUC (P1)

The methodology applied in order to study Ground Water/Surface Water interaction at reach scale was

- Installation of well clusters at the reach scale to define the 3D extent of the riverbed hydraulic characteristics
- In situ studies of the hydraulic properties of the riverbed. These studies included: Pumping Test, Injection Withdrawal Tracer Studies, Infiltration Experiments
- Laboratory studies to evaluate the hydraulic properties of the riverbed. These studies include column experiments for the evaluation of porosity, hydraulic conductivity and dispersivity.

During the second field campaign that was conducted during the reporting period, were performed sampling and experiments that deal with the first and second objectives of the methodology. The second field campaign has been designed in collaboration with NCMR and it was implemented in October. The main objectives of the field campaign were:

1. Further evaluation of riverbed sediment hydraulic characteristics at the study site, verification of the revised tempQsim hypothesis for Krathis, and sampling for the characterisation of in-stream processes (In-situ infiltration experiments, Monitoring of well clusters, Sediment sampling). Figure 4 presents results from the infiltration experiments and figure 5 measurements from the multi-level wells.

2. Sampling for the evaluation and assessment of selected C, N and P processes (denitrification, adsorption, mineralisation) in terrestrial sites for various landuses (Lyssimeter studies, groundwater and soil sampling). A paper was written and it will be presented at an international conference on the assessment of the N and P cycles at the reach scale.

EAWAG (P4)

Expansion and contraction dynamics:

In November 2003, dry sections were mapped in five selected headwater sub-catchments. Data were included in a GIS-map, and length and proportion of dry channel sections were quantified. Two additional stage recorders were installed in the main study sites (left and right bank) to get better information on water level fluctuation. Seventeen piezometers were installed in Reach IV (river-km 80; three transects) and equipped with temperature loggers (VEMCO-loggers). The extent of the dry section was repeatedly mapped using a dGPS. Oblique photos were taken at

different water levels from the rim of Mte Ragogna and geo-referenced. These data will be used to develop a GIS-based model on inundation dynamics and ecosystem processes at the flood-plain scale.

IMAR (P5)

As during the summer in the winter water quality was monitored both on a continuous basis at a fixed station (Probre YSI 6600), and on water samples regularly collected at the sampling site. A number of parameters obtained by different methods (Probe and analytical laboratory methods) were compared. Other parameters that could not be measured in situ were determined in the laboratory. Preliminary experiments to determine denitrification rates were performed in the laboratory.

Denitrification experiments were according to the proposed Protocol.

The results obtained with the YSI probe on water parameters, during the period that corresponds to the present Report, are available at the tempQsim project database.

Despite some difficulties and the loss of the first flush event of October, it was possible to obtain a set of results between the end of January and the beginning of February 2004 that seems to be representative of the stream response to winter freshets.

Conductivity, pH, oxidation-reduction potential (ORP), dissolved oxygen (OD), and chlorophyll were regularly determined in grab samples collected in the same sampling site and were reasonably consistent with the results obtained with the probe. However only one determination was performed for chloride in the laboratory, so that there is a clear need for more determinations.

The same holds for ammonium/ammonia and nitrate laboratory analysis, the probe determinations being under close scrutiny, compared with FIA and Standard Methods procedures and object of intercalibration exercises with other laboratories.

Determinations of chloride, nitrate and ammonium in the laboratory (by FIA and SM procedures) - to confirm the results obtained with the probe- will continue to be performed regularly, and will be compared with another laboratory determinations (intercalibration). The same will hold for other parameters, such as dissolved oxygen, conductivity, pH, and oxidation-reduction potential.

A new nitrate selective electrode will be tested soon and new electrodes of ammonia and chloride will be purchased as the present electrodes are approaching the limit of their useful life in the field.

Collection of field grab samples of water for analysis in the laboratory will continue as well as the maintenance of the probe and in-situ measurements.

IRSA (P6)

IRSA is not responsible for a test catchment. IRSA researchers are co-operating with Hydrocontrol in the planning of the field activity related to gauge site locating, selection of the instrumentation and monitoring framework.

CSIC (P7)

At Vallcebre, the main work during this reporting period was the recording, sampling and analysis of events at the Can Vila catchment in order to know the quality of these waters and to improve the knowledge of the hydrological functioning, especially on the exchanges between surface and underground waters (Tasks 3.1, 3.2 and 3.3). A set of 4 significant events between late October and mid-December, 2003, were studied. The comparison between the dissolved concentrations of the stream waters during these events and the dissolved concentrations of waters taken from different compartments in the catchments allowed to perform a ‘runoff separation’ into two com-

ponents, groundwater flow and overland + quick shallow subsurface flow. The comparison between these results and the flow separation using other methods (TOPMODEL, water table-baseflow relationships) will be performed during the next months (Tasks 3.4 and 3.5), using the results obtained in WP2.

At El Albujón, once two weeks, the water flow sampling, and subsequent chemical analyses campaign has continued until February 2004 in five points along the main the channel. From March on, the continuous water sampling campaign is carrying on once per month and reduced in two selected points in the main channel. The results of the continuous campaign show high levels for nitrates and ammonia in all measurements points. In general, low differences appear among the several points along the channel. The dissolved solid concentrations are in general low and constant along the measurement period although an increase of these values can be observed from summer-2003. Significant differences between different points along the channel have been detected for this parameter.

Periodical groundwater sampling has been incorporated into the aforementioned field sampling campaign to contribute to the understanding of relationship between water in the soil and watershed response. With this purpose chemical water analyses and hydraulic head measurements in five selected wells nearby to the channel are being taken.

In addition, two significant flood events have occurred during the period covered in this re-port, in November 2003 and April 2004. Both of them were intensively manually sampled during the rising and falling limb of the hydrograph. All water samples and sediments during both flush events have also been analysed for chemicals. The water and sediments samples from the flood occurred in november-2003 (included in the previous report) have been also analysed. These results show an increase of nutrients values and organic carbon at the beginning of the flood and a decrease of those values with time. The nutrients absolute values are between 3 and 5 folders lower than those obtained in the continuous base-flow sampling. On the contrary, sediment concentration is about five folders higher in the extreme event.

The April 2004 flood was followed deeply, controlling the main channel in several points and main tributaries; focussing in the support to the conceptual model of the watershed in accordance to the TempQsim guidelines. This type of study provides a better idea of the relation-ships between the rain typology and the relative importance of pervious-impervious lands to the response.

Also all submetrical GPS measurements from the cross profiles in the channel have been corrected, using AutoCAD, and analysed. Eventually, these have been used to calculate the discharge-stage curve in the main channel and applied to the stage recorded by the hydrostatic pressure sensor to obtain the continuous base flow and flow during the events.

MSEM (P8)

As the catchment owner, the MSEM team continued data collection on the Vène catchment, on the same basis as previously. Rainfall and discharges were continuously monitored at the gauging stations (three rain gauges and four stream gauges). Regular monitoring (bi-weekly) was performed for chemical elements. Three floods were sampled automatically during the autumn period, at the four gauging stations. All water samples were analysed for chemicals. Two spatial campaigns (22 points in one day) were realised along the river in January and March 2004. All the samples were analysed for chemicals.

The first comparisons of pollutant loads along the river showed the importance of regular point-source inputs compared to groundwater and diffuse pollution inputs in the river. Point-source pollutants, accumulated in the riverbed during the dry period, are flushed very quickly during the floods, as shown by the monitoring during September 2003.

A special effort was made to improve knowledge of soil physical and chemical properties. The soils (to 1 meter depth) from two vineyard parcels were studied in term of porosity, bulk density, N and P content, pH, etc … In the same way, the soil water content was measured regularly using the TDR method and controlled by gravimetric measurements.

UACEG (P9)

All planned work has been carrying out according to the Gantt chart. There was delay in staring of some tasks in WP3, because of seeking for additional financial funds so that a monitoring station to be built. After completing of this work by the end of the last year, the plan was caught up (respectively, some person months were worked out).

The monitoring station was equipped with multiparameter sensor for continuous recording of 7 parameters: water level, temperature, dissolved oxygen, pH, redox potential, turbidity and conductivity. In this way, new set of water quality data has been creating, which will be used both for recording of the flush events and for validation of the calibrated model (Task 3.3 - calibration data). More qualitative parameters from this station and from other important stations have been analysing in laboratory conditions: TOC, DOC, TSS, N-forms, phosphates, Cl.

To study groundwater interactions (Task 3.2), two different techniques were used: iron rebars and minipiesometers. Results, obtained so far were reported in the paper mentioned above. This study was completed for low winter period. It will continue during other seasons and water levels.

The basic considerations for perceptual model of the investigated site was developed (Task 3.4) and reported in the third co-ordination meeting in Sardinia. After having complete set of the parameters, the model will also be further developed and completed.

All field and laboratory work was performed following the protocols agreed in the project meetings (Task 3.5 – quality control).

NCMR (P10)

Continuing of the regular (monthly) field campaigns for water quantity and quality assessment.

In November, two lysimeters at two different land-use areas (forest and agricultural land uses) have been installed. Samples from the lysimeters are collected on a monthly basis (from December up-today). In order to preserve the samples, conservation liquid is placed into the lysimeters before each sampling.

In November, the last groundwater samples from our piezometers (which have been installed at the reach) have been collected; the flood events that took place in January destroyed all the piezometers!

In December, two rain collectors, one downstream at the gauging station and one up-stream at Tsivlos-hydropower station, have been installed. Bulk precipitation samples are collected in a monthly basis (from January up-today). In order to preserve the samples, conservation liquid is placed into the rain collectors before each sampling.

In February, a data logger for the second rain gauge (at Tsivlos) has been installed.

Between the end of March and the beginning of April Prof. Burghardt with Y. Amaxidis inspected the catchment area. Areas threatened from erosion have been detected, different soil types have been pinpointed and soil/ water sampling from 10 extra sites has been performed.

To gain a more detailed figure on local sources of organic matter and nutrients besides the regular water samples, 10 additional water samples have been collected from Krathis tributaries in April. In-situ measurements for physicochemical and hydrological variables have been also performed.

The end-user (Dr. E. Tiligadas–Ministry of Environment, Physical Planning and Public Works/ Directorate of Land Reclamation Works/ Department of Hydrology) has visited the gauging station and made suggestions on future improvements.

HYC (P11)

In these last six months Hydrocontrol continued with the water quality monitoring campaign in the four sampling sites chosen all along Mulargia stream.

In the two sites (site B near the spring and site D in the outlet) where automatic stations were installed, the on line monitoring of the principal water quality parameters (pH, Temperature, EC, dissolved oxygen) and the collection of flow paced samples for measuring water quality parameters are always being conducted. In this way in these last months as well, it was possible to follow the chemical parameters dynamics with flow trend from upstream to downstream and to evaluate pollutant loads along the stream during floods.

The evaluation of the pollutant load trends from November 03 to April 04, allowed to point out the great importance of the first flood (occurred at the end of October 2003) in loadings formation with particular regard to SS, AFDM, dissolved nitrate, particulate organic nitrogen and particulate phosphorus which were washed into the stream from cultivated lands.

In fact during the following floods occurred in winter and spring, even if the flows reached higher values than in the first one of October, the suspended and particulate matter loads were always definitely lower.

ULEEDS (P13)

The University of Leeds has maintained a co-ordinating role with respect to WP3, but has no direct association with a test site. The main activity in this period has been to ensure that first flush events were recorded for all test sites, and that results were comparable, subject to inevitable differences in instrumentation prior to the project and the particular needs of each site.

2.4 Work package 4: Bottom-processes

UHANN (P1)

The contributions from UHANN to the WP4 during the reporting period have been focused on the revision of the first results from the study sites. There is still a need to understand better the wetting and drying process, which will have implications on the process rates. Activities of UHANN to this topic where dedicated to stimulate the integration of the discussion of the perceptual model to future model improvements and consideration of WP4 findings.

For the continuation of the sediment characterisation UHANN discussions with UESSEN have taken place. For future sampling the relevance of the accumulation during the dry period will be emphasised.

UHANN stimulated also the discussion of a common publication considering the outcomes of the current results in WP4.

TUC (P3)

The methodology applied to study the Channel Bed processes and develop the conceptual site model for Krathis river sediment involved the following aspects:

1. Installation of monitoring stations for the three dimensional characterisation of the geochemistry of the river sediment

2. Collection of baseline physicochemical data for characterisation of the riverbed

3. Evaluation of sediment hydraulic characteristics and groundwater - surface water interaction

4. Laboratory studies to evaluate the physicochemical properties of the riverbed

5. Laboratory studies to quantify critical processes (Column studies and mesocosm studies)

6. Assessment of C, N and P processes.

The first three aspects have been completed and an initial assessment of the sixth item has been conducted. It is planned to conduct the lab experiments in the next 6 months of the study. Specifically, the following studies:

1. Respiration and Denitrification studies in the field (according to the protocols created by Klement Tockner and Jana Topalova)

2. Leaching studies (the protocol has been developed and sent to the other partners)

3. Sorption studies (the protocol has been developed)

4. Mineralization studies (the protocol has been developed and sent it to the other partners)

A detailed description of the conceptual site model has been written and will be presented at an international conference.

EAWAG (P4)

Decomposition experiments:

Decomposition experiments (leaf-bag method) were carried out in December/January 2003/2004 to simulate the impact of frequency and duration of wetting and drying (ten treatments following a random-block design with 4 replicates each; Figure). Samples were analysed (C, N, P, AFDM, ergosterol), data statistically treated, and a manuscript for a peer-reviewed journal prepared. Respiration and biofilm development

During two major sampling campaigns (January, April 2004) discharge and vertical hydraulic gradient were measured at 2-km distances along the 40-km river reach (using ADV, ADP, and minipiezometers). Between 8 and 9 transects were studied. Surface- and subsurface water samples were collected for chemical analyses, and sediment respiration (respiration chambers) and surface biofilm (AFDM, Chla) were quantified. Laboratory experiments applying a respirometer (Licor) were carried out for assessing sediment respiration on gravel bars and vegetated islands.

A novel method to measure denitrification in situ (N15 isotopes) was tested.

Unsaturated sediments

30 cage pipes (1m long) were constructed at the EAWAG workshop to investigate bed-sediment processes in the unsaturated zone. Cages will be installed in three different depths and filled with sediments. It will allow investigating the influence of groundwater fluctuations on bed-sediment processes.

IMAR (P5)

Documentation of spatial and temporal dynamics of drying beds

Field mapping techniques (gridsystem and GPS) were used in order to quantify maximum contraction. This quantification was made in the main stream (Pardiela) at the end of summer.

In a near future (Summer and Fall 2004) it is planned to quantify expansion/contraction dynamics to all basin.

Investigation of sediment quality dynamics

- Sediment characterisation in terms of permeability, cohesion, grain size distribution and elemental geochemistry were made in two different sites characteristics (depositional and transport zones).
- Nutrient and tracer additions experiments were made to examine the effect of hydrological processes on nutrient retention. Three additions were performed from winter to early spring in flow conditions.
- Sediment respiration was quantified using respiration chambers (Uehlinger protocol). Four respiration measurements were made in different seasonal situations: on the end of summer at contraction conditions; on winter at expansion; on early and middle spring. In the future this quantification will be done to encompass the drying process (from late Spring until Fall).
- Decomposition experiments (leaf bags) were done with Populus nigra leaves. Three different habitats were evaluated: (1) riffles; (2) pools; and (3) terrestrial habitats. The experiments were based in RivFunction protocol for five sampling dates (0, 7, T20, T35, T50, T70 days); two different bags mesh sizes (coarse-10 mm and fine-0,5 mm) and four replicates. Decomposition experiments were performed from fall to winter, encompassing the expansion period.

Role of microbial communities

- Microbial communities were sampled and analysed in water and sediment in order to quantify their role in the transformation processes. In this subject, abundance and average cells measurements were made, this last one in order to estimate the bacteria carbon content. Samples were collected monthly since last Winter;
- Chlorophyll a were analysed on the top of sediment (perifiton). These analysis were performed from the end of summer at contraction conditions and monthly after flow conditions in early fall.

Quantification of transformation processes

- In order to understand transformation processes in temporary streams, nutrient leaching/retention are planed to be study in laboratory experiments. We pretend to simulate the drying/re-wetting process by changing the percentage of moisture on sediment.

IRSA (P6)

In the period November 2003 – April 2004, the IRSA team, working on sediment processes, completed analyses to characterise biologically and chemically the sample previously collected and proceeded in the setting up of protocols to measure microbial activities.

On January 2004, in collaboration with HyC a field campaign on the Mulargia basin was carried out to characterise the riverbed sediment in a period of maximum flow, opposed to the very dry situation sampled in September, before autumn flushes. These samples were also used to determine for the first time microbial activities, as bacterial carbon production and extracellular enzymatic activities, other than measuring community respiration.

The protocol for the measurement of bacterial carbon production, derived from applications in the water environment, was set up in collaboration with researchers of the EAWAG Limnological Research Centre, in Kastanienbaum. Analyses of bacterial diversity, by FISH, were also defined in this period and applied to samples collected since July 2003. An updated draft of microbiological protocols, applied by IRSA, was distributed to all partners during the mid-term meeting.

IRSA and EAWAG researchers meet at EAWAG, in Zurich, to plan an experimental project to estimate the impact of drying and rewetting of riverbed on microbial communities. The proposal, sent to all partners involved in WP4, was later discussed by mail and, finally, approved in the mid-term Cagliari meeting. The project will use the “microcosm” approach to evaluate in labora-

tory the main sediment processes, regarding community respiration, microbiological activity and nutrient exchanges, as affected by soil moisture and their resistance and resilience to dry periods extended in time.

On March, during the Cagliari meeting, all results previously obtained were presented and discussed. During the field trip, sediments from Mulargia were collected by IRSA, sieved 2mm and distributed to partners interested in the cross comparison of microbiological determinations. This sample was later characterised and used for preliminary experiments to test the microcosm approach.

MSEM (P8)

MSEM team welcomed ESSEN partner in February, for sediment sampling, in the riverbed. One day meeting was organised to exchange experience on catchment behaviour and to define sampling protocol.

MSEM team conducted field experiments about soil quality on the catchment to quantify the spatial variability of N and P content at the field scale. Other analyses were made on 4 1 m-soil profiles to quantify the variability of N and P with depth.

UACEG (P9)

The study on spatial and temporal dynamics (Task 4.1) started first year and continued during the investigated period. The dynamics has been monitoring once per season for 9 sampling points along the river length and once per month for additional 5 sampling points at the selected reach.

In order to study sediment quality dynamics (Task 4.2), at 5 transects in the selected reach 3 to 5 minipiezometers were installed. Interstitial water was pumped and its quality was analysed. Sediment samples were taken and analysed in the laboratory.

Microbial communities (Task 4.3) have been determining according to the established protocols for the river water, for the interstitial water and for the sediment. The dynamics of total microbial count, oligotrophic bacteria and Enterobacteria was investigated.

First studies have been done in order to get the rates of the transformation processes. Respiration chambers for both aerobic carbon transformations and denitrification were tested (Task 4.4). Intensive work in this direction will be carried out in the forthcoming period, combining both field and lab experimental techniques.

The results, obtained in WP4 were valuable tool to start developing of the perceptual model for the Iskar subcatchment.

NCMR (P10)

Continuing of the regular (monthly) aerial photographing for the estimation of the expansion/ contraction cycles at the reach. Image analysis is in progress.

Continuing of analysis of groundwater from drillings.

Analysis of groundwater from piezometer samples is completed.

Analysis of organic matter and nutrients of surface and core reach sediment samples is completed.

In order to study in-situ respiration in aerobic sediments, five respiration chambers have been constructed following the respective tempQsim manual.

HYC (P11)

Collaboration with IRSA in field campaign

UED (P12)

During the past six months scientific progress was made especially in terms of getting more results and findings about the two study sites Vène and Albujon. Two field campaigns in France and Spain were carried out for sediment sampling and partner meeting. Laboratory work continued well, due to personnel extensions.

Spain: In January/February 2004 the first field trip to Spain was done. Two scientists of UED spent two weeks in the study area of the river Albujon. During this trip three meetings at CEBAS-CSIC were arranged. The main task was to collect soil and sediment samples in the catchment area. The analyses of the samples are still in progress.

France: At beginning of March 2004 two persons of UED went to France for one week. During this week two meetings with the partners of UMII-MSEM took place in Montpellier. UED got 48 sediment samples of MSEM in order to analyse them in the lab of University Essen. Furthermore in the study area of the river Vène the riparian sediment was sampled. The analyses of all samples are still in progress.

Greece: At beginning of April the PhD student Mr. Amaxidis was supervised by Prof. Dr. Burghardt in sediment sampling at the river Krathis.

Within the reporting period the analyses of sediment samples has been continued at the laboratory of University of Duisburg-Essen.

2.5 Work package 5: TempQsim module

UHANN (P1)

Different opinions about best future model improvements and the distribution of the programming work made an additional effort of UHANN necessary to stimulate a common discussion and consensus.

During the reporting period UHANN was involved in determining concepts for future proceedings.

The close interaction with the partners CSIC and TUC, especially during a short work visit, ensured the knowledge of the common simplifications and problems in conventional models regarding the special dynamics in catchments in the Mediterranean.

Results from the HarmoniCa conference in Brussels are considered in defining appropriate strategies for the model improvement. Rationales for model complexity required were investigated and presented to the tempQsim-midterm review.

As a consensus during the mid-term review workshops it was agreed to consider 2 major types (event based and continuous models). It became evident that improvements will be needed in the area of hydrology, sediment transport and mass balances, and dependence of occurring processes from available moisture conditions.

Beside the conceptual studies UHANN had mainly worked on improving the CASCADE model with extending the approaches of sediment transport. Therefore the Cascade code was received from NERC during a short visit in Wallingford. Test runs of the new modules will be made on the Vène catchment in close interaction with NERC and MSEM.

A concept for specific extension of the Cascade model, considering multi-fractional sediment transport, was prepared. In order to get some more experience with problems to be expected

during the model-improving phase, source code modifications has been already initiated. The experience will support the common harmonisation of model improvement and the further development of the software development protocol.

NERC (P2)

The in-stream component of the CASCADE model is being further developed in collaboration with Matthias Obermann of the University of Hannover. Its functionality will then be better suited for use as a module for describing water quality processes in temporary waters. This development will be informed in particular by data from the Vène.

At a coarser scale, it is planned to link a modified form of this model to the PESERA delivery model.

TUC (P3)

The basic methodology for the improvement of the riverbed module in HSPF is the following:

- Conduct field and laboratory studies for the development of a conceptual site model for river – groundwater interactions,
- Study the geochemical processes and evaluate the rate constants,
- Compare the existing HSPF formulation with the conceptual site model,
- Implement changes to the code, and
- Test the revised model.

The TempQsim module should be capable of simulating:

1. The hydrologic regime of Krathis at the reach scale; 2. The expansion-contraction dynamics based on aerial photo derived relationships; 3. The C, N, and P cycles in water and sediments; 4. Sediment transport dynamics (hot spots-hot moments).

TUC has developed the Conceptual Site Model (CSM) for Krathis, which will be the basis for the development of the new module, and TUC has evaluated HSPF and compared it to the CSM for Krathis.

TUC has prepared all protocols for process studies of the geochemical processes that will be input to the model.

IMAR (P5)

In order to obtain a global overview of the technical and scientific details of the models to improve, a software development was elaborated and distributed to all the partners of tempQsim.

This software development protocol covered the following five areas:

1. Identification of major limitation of exiting models
2. Technical details of selected models
3. Prioritisation of the processes to be handled
4. Definition of the algorithms to be developed
5. Software development of integrated modules

To make an inter-model comparison, the software development protocol includes two as annexes two inquiries: (i) one inquiry, which is, addressed two WP2 teams and (ii) one inquiry, which is, addressed two WP5 teams.

The goal of the first inquiry is more scientific, once it contains questions about the scientific background on which the selected models are based.

The goal of the second inquiry is more technical, in order to find a reasonable method to improve the selected models (modifying the individual models, build a common base library or build a new model from exiting knowledge with knowledge obtained during tempQsim).

The returned inquiries were analysed and the conclusions were presented at the last tempQsim mid-term Meeting in Sardinia.

From these inquires the following conclusions were drawn:

New developments should follow a modular approach

Developments should include the necessities of each partner

Each partner is responsible to couple new developments to its “own” code.

Each new module to develop should include: a rationale, equations and parameters and the source code.

What was not yet decided was which partner will develop which modules. Meanwhile, in the near future two major developments will take place: (i) The model PESERA and the model CASCADE will be linked together into a new model called PESCAS and (ii) IMAR will develop a set of modules which can be coupled to existing code or build a new model. The idea of IMAR is to develop a model which will follow the general idea of SWAT, but which will overcome its limitations in temporary waters.

The second major task of WP5 is the development of the new tempQsim modules.

IMAR is developing a set of modules, which follow the object oriented programming, which is described in the article “The object oriented design of the integrated Water Modelling System MOHID”. This article was written in the aim of WP5 and submitted and accepted for oral presentation of the conference “Computational Methods in Water Resources 2004”.

IRSA (P6)

A first insight in highlights and deficiencies in the SWAT model when used in intermittent rivers have been carried out on the basis of the analysis of the structure, of the scientific basis and of the numeric approaches adopted by the model.

Contacts have been set with the SWAT developers in USA to agree the terms of a closer co-operation in view of forthcoming visit and 3-4 months stage in Temple (TX) of IRSA re-searcher and PhD student to take place in autumn 2004.

CSIC (P7)

Perceptual models of the hydrological behaviour of Albujón and Vallcebre catchments were developed as a basis to build the TempQsim modules. The perceptual model were presented and discussed during the midterm meeting in Sardinia.

As stated before, TOPMODEL is able to adequately simulate the main functioning of the Vallcebre catchments during wet periods, when water is moved by gravity. The main limitations of the current version of TOPMODEL for simulating the functioning of the Vallcebre catchments during

the whole year were identified as the inadequacy of the submodel that simulates the movement of water by evapotranspiration and soil retention. Indeed, this version considers a one-way transfer of water from the root zone to the unsaturated zone and the saturated zone, whereas it is clear from the observations that the saturated store is depleted by evapotranspiration especially during the dry season. Furthermore, rainfall interception is not explicitly considered whereas it represents about 24% in forested areas. Simpler daily water balance models that use only one store were used successfully in Vallcebre. On the other hand, there are other versions of TOPMODEL that consider the capillary return from the saturated store to the soil moisture that feds plant transpiration, although there is limited experience with these versions. The theoretical model (Task 5.1) is therefore under development, and the selection of equations and implementation of the code will be started in the next months.

MSEM (P8)

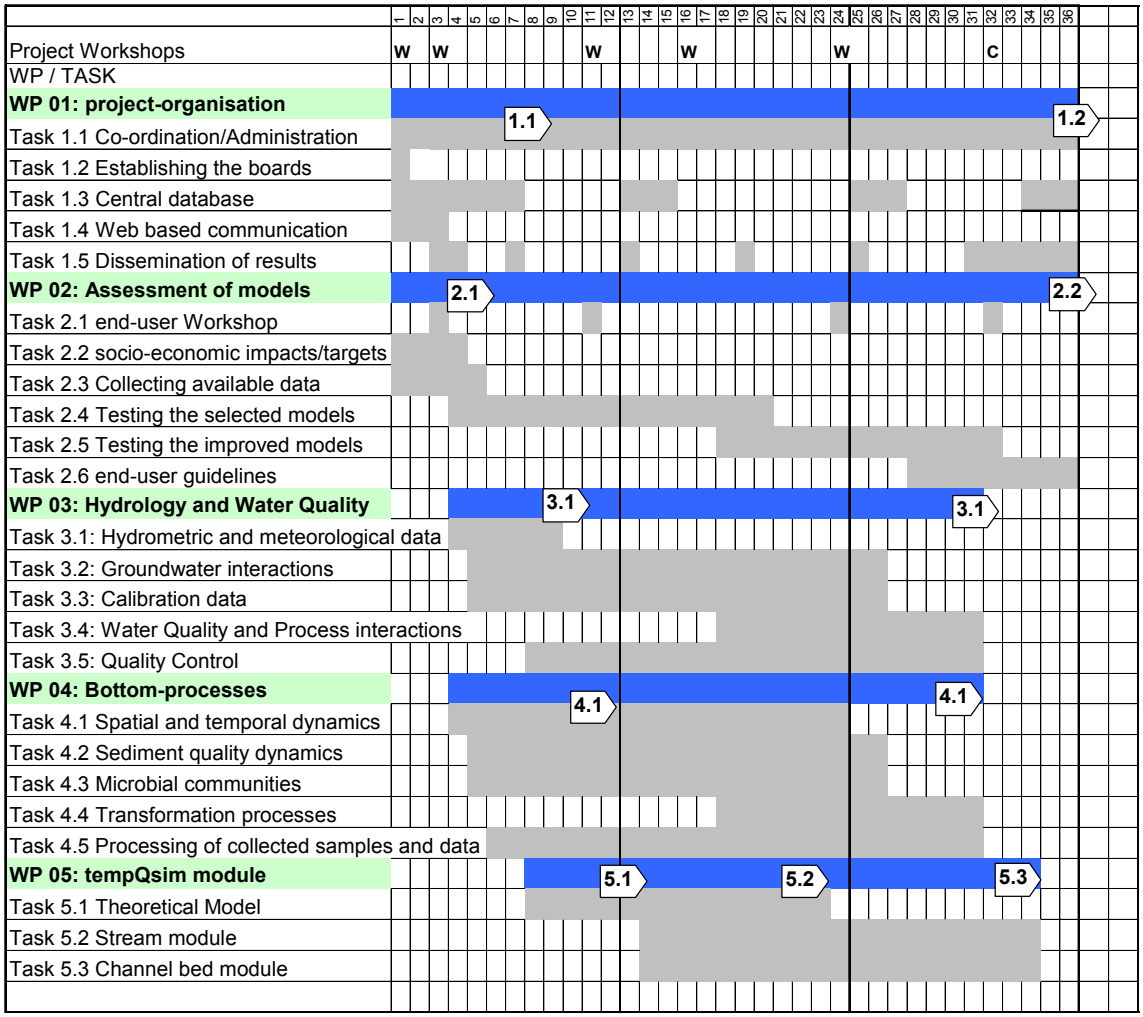
After the first run of the ATHYS-POL model on Vène catchment, it appeared that the model could not be used for the first flush flood modelling. The lag and route transfer routine didn't take into account the specific geomorphology of the riverbed especially on its downstream part. A new transfer function was developed using the cinematic wave method. Rugosity coefficients were estimated using a physically based model using the Barré de St Venant equations, calibrated taking into account measured water levels along the river in various hydrological conditions.

In the same way, the ATHYS-POL model, using previously for the N fluxes modelling, was modified for the P fluxes modelling. To complete the river water quality modelling, the CASCADE model will be used on the Vène catchment.

UACEG (P9)

The theoretical model is being developing considering the literature review, the discussions in the two meetings (in Brussels and in Sardinia) and the experimental results (Task 5.1).

Gantt chart



2.6 Comparison between planned and used manpower and financial resources

In general the financial resources have not been allocated / spent as originally planned. The 2nd payment was allocated based on this situation.

The manpower was provided as planned. For some AC partners (UHANN and ULEEDS, see below) a stronger engagement of permanent staff or staff financed from other sources has been used for tempQsim.

UHANN (P1)

There was no deviation in total person months compared to the workplan. The budget for personnel costs has not been used as planned in the CPF.

At the beginning of the reporting period the proportion of project-financed staff was increased compared to the previous reports.

3 Milestones and deliverables achieved

	Deliverable/report	Month	Deadline	
D 1.3 (3)	Reports from Steering Committee meetings, Advisory Board meetings, Workflow monitoring reports, Workshops proceedings	18	30.04.04	Re
D 2.2 (1)	Test results of existing, unmodified models	14	31.12.03	Si, Re
D 5.2	Interface between modules and the catchment models	18	30.04.04	Me, Pr
D 5.3 (1)	Improved versions selected catchment models (to WP2)	14	31.12.03	O

D 2.2 (1): Reports on the application of unmodified models have been prepared for most of the catchments. Reviewed reports will be collected during July 2004 and will be ready to be homogenised before to be sent to the EC. Expected delivery will take place within the month of July 2004.

D 5.2: Inquire to modelling partners, and synthesis by IMAR describing the general rules for module design, documentation and interfacing (Guidelines).

D 5.3 (1): SWAT has been modified to allow sub-daily outputs. New Hydrological modules developed by IMAR have been successfully tested in Pardiela sub-catchment (Computer Program).

	Milestones	Month	Deadline
M 3.1 (3)	Six-monthly reports on progress, circulating relevant deliverables to all participants and CEC officers	18	30.04.04
M 4.3	Six-monthly reports on progress, circulating relevant deliverables to all participants and CEC officers	18	30.04.04

4 Deviations from the work plan or / and time schedule and their impact to the project

UHANN (P1)

Major deviations related to the work plan are caused by the missing availability of data for the run-off calibration from the Albujon catchment. In order to keep the total work plan, UHANN already started with modifications of the Cascade model. The inclusion of Cascade in the UHANN activities and contributing to study the Vène catchment will have the advantage to increase the number of model applications at the Véne and to include the very valuable time series elaborated by MSEM.

As soon any run-off and water quality data will be provided by CSIC in time the HSPF model will be recalibrated. Model extensions for the HSPF might face some difficulties because of the comparable closed source code. Strategies will be elaborated together with TUC to couple tempQsim modules to the HSPF as soon as first results of the Cascade improvements are available.

Difficulties are revealed to finalise an extended perceptual model for each catchments. The future work will follow the advise of the external reviewers to identify fundamental basic questions relevant for all study sites.

Even at availability of the noticed scientific problems, the strong identification of the participants with the project has to be highlighted, which provide the required communication and motion to work on alternative solutions.

TUC (P3)

There is a deviation between planned and used financial resources. In terms of personnel costs, we used 2500 € less than originally planned. The reason for this deviation was that two graduating students (equivalent of MS degree) have been used in the project and the University fixes their financial support. We plan to carry over these money into the next six months were other professionals will be hired to help in the project.

IMAR (P5)

Unfortunately the first flush flood event wasn't registered because of technical problems with YSI 6600 probe, which was controlling the automatic sampler. This probe measures water quality parameters and water levels. The automatic sampler has a built-in communications module, which should be use to call a filed-work officer in case of water level rise. Both systems were connected using a RS232 protocol.

Levels measured by the probe were processed by the automatic sampler using software developed by IMAR in order to sample according to water level rise, in order to sample the beginning of the flood, at maximum rate of water level increase and at the beginning of water level decreasing. Hardware problems at the interface between this probe and the automatic sampler cause the failure of this strategy. The manufacturer of the probe repaired it and it failed again.

As a contingency plan another water level probe and a pluviometer were bought and connected to the automatic sampler. Communications functionality have been maintained but online information is only available on pluviosity and water level, provided by the new sensors connected to the automatic sampler.

IRSA (P6)

Results of the model run in the Mulargia catchment will be available in due time in the month of June 2004.

A co-operative report made on the basis of the contributions from all the modelling institutions regarding the strengths and weaknesses of the models will be drafted in June 2004 and reviewed in July 2004. This will be the basis for the "TempQsim module" to be developed in the WP5 framework.

MSEM (P8)

The MSEM team has no competence on the study of the riverbed sediment and until now very few data are available on the Vène river catchment. This problem will be solved soon with an active co-operation with the UESSEN team. A first visit of this team was made in February 2004; two others will be done in July and September.

UACEG (P9)

Only deviation from the work plan concerns Task 2.5 – testing of improved models. It had to start in the last month of the reported period (project month 17). It will be done when such a models are ready to be tested.

NCMR (P10)

There is some delay concerning the analysis of a part of dissolved and particulate nutrients and DOC which will not affect the work plan and time schedule of the project.

The cross-section at the automatic gauging station should be improved. For that purpose construction activities are needed. This subject is currently being discussed with the Municipality of Akrata for covering this activity. The cross-section will be improved in order to gain a better figure on water discharge. This activity will not affect the work plan and time schedule of the project.

By installing a series of piezometers in June 2003 it was found out that there is no groundwater/ surface water interaction at the reach. To better understand this process, we are discussing the option to carry out additional drillings at the upstream of the river. This activity, which will be probably carried out during the 3rd comprehensive field campaign (in the oncoming summer) will improve the knowledge on the underlying hydrological processes controlling aquatic quality. No impact on the work plan and time schedule of the project is anticipated.

HYC (P11)

As for experimental survey on water quality parameters dynamics during flood in Mulargia stream, there were no deviations from the work plan.

5 Co-ordination of the information between partner and communication activities

5.1 Co-ordination of information and communication activities of the whole consortium

UHANN (P1)

The major information and communication exchange amongst all participants during this reporting period have been organised by UHANN and HyC within the mid-term review meeting. Beside the team presentations and the thematic workshops there were provided a number of opportunities to discuss the interaction and common proceeding in the area of model improvement and sampling.

The further completion of the Database led to a first assembly of the existing data submissions and the central distribution of data for interested parties during the mid-term review.

The forum on the project website where further promoted by UHANN in order to provide additional means for group discussions.

5.2 Forthcoming events

The next project meeting will take place in Sofia from 9th (at 9 a.m.) to 11th September (5 p.m.) 2004.

UHANN will represent the project on the next CatchMod meeting in Brussels on June 11th.

The next EGU Meeting in Nice will require a serious preparation effort by the entire consortium.

For 2005 applications to the Stockholm Water Week should be taken into account.

TUC (P3)

TUC will present the following paper at the International Conference, Protection and Restoration of the environment VII, in Mykonos Greece, 28 June – 1 July 2004

“In stream geochemical processes of temporary rivers – Krathis river case study”, Ourania Tzoraki, Georgios Amaxidis, Nikolaos Skoulikidis, Nikolaos Nikolaidis

EAWAG (P4)

Four oral presentations are given at the annual meeting of the North American Benthological Society (Vancouver, June 2004).

1. Döring M., Uehlinger U. and K. Tockner. Large-scale surface-subsurface water exchange and ecosystem processes along a braided corridor of a large gravel-bed river (Tagliamento River, Italy).

2. Langhans S.D. and K. Tockner. The role of inundation in controlling leaf litter decomposition in a braided river.

3. Uehlinger U., Schlaepfer D., Rotach A., Döring M. and K. Tockner. Expansion and contraction dynamics of a large Alpine river (Tagliamento River, Italy).

4. Yoshimura, C., K. Tockner, M.O. Gessner H. Furumai. Decomposition of Fine Particulate Organic Matter (FPOM) in Streams.

IMAR (P5)

Two oral presentations are given at “Computation Methods in Water Resources 2004”, North Carolina, USA, June 13 - 17, 2004:

P. Galvao, P. Chambel Leitao, Ramiro Neves, and Paulo Chambel Leitao “A different approach to the modified Picard method for water flow in variably saturated media”.

F. Braunschweig, P.C. Leitao, L. Fernandes, P. Pina, and R.J.J. Neves “The object-oriented design of the integrated water modeling system MOHID”

Presentations will also be organized to show results to the endusers: INAG and EDIA.

MSEM (P8)

Tournoud M.G., Perrin J.L., Gimbert F., Picot B.: Spatial evolution of nitrogen and phosphorus loads along a small Mediterranean river: implication of bed sediments. Hydrological Processes, submitted.

Dechesne M, Perrin J.L., Tounoud M.G.: Soil pollution experimental investigation for different land uses: Vène catchment (South of France). European Geosciences Union, 1st General Assembly, 25-30 April 2004, Nice, France (Poster).

Tournoud M.G., Perrin J.L., Salles C., Picot B.: Spatial heterogeneity of pollutant fluxes along a intermittent river: contribution of diffuse and point source inputs under different flow conditions. European Geosciences Union, 1st General Assembly, 25-30 April 2004, Nice, France (Communication).

Grillot C., Perrin J.L., Tournoud M.G.: Application of a distributed hydrological model to heterogeneous nested intermittent river basins: MERCEDES model and Vène river (South of France). European Geosciences Union, 1st General Assembly, 25-30 April 2004, Nice, France (Poster).

UACEG (P9)

XIII International Symposium “Ecology”, 7-11 of June, 2004, Sunny beach resort, Bulgaria. A paper will be presented: “Winter low flow spatial dynamics for selected reach of Iskar river upstream”.

NCMR (P10)

Paper preparation from O. Tzoraki, Y. Amaxidis, N. Skoulikidis and N. Nikolaidis for an oral presentation on the International Conference for the Protection and Restoration of the Environment VII that will be held in Mykonos, Greece, during June 28 to July 1, 2004, with the title: “In Stream Geochemical Processes of Temporary Rivers – Krathis River Case Study”.

Field activities preparation for the 3rd comprehensive field campaign (possible additional drillings upstream and improvement of cross-section at the automatic gauging station, in-situ respiration measurements, etc.)

HYC (P 11)

Hydrocontrol sent an abstract entitled “Water quality dynamics of a Sardinian temporary river during flood events“ to ERB2004 - Euromediterranean Conference on progress in surface and subsurface water studies at the pilot and small basin scale -, which will take place in Turin next October 2004. HyC is waiting for the acceptance of the work.

UED (P12)

UED will present following the paper at the EUROSOIL conference, 4th -12th September 2004 in Freiburg: Kretschmer, S. & Burghardt, W.: High nutrient and sediment loads of the temporary river Albujon related to human impact induced soil erosion (Murcia, Spain)

The oral presentation will be part of the symposium Soil Erosion.

Furthermore in October 2004 a workshop about implementations of the European Water Framework Directive will take place in Kiel/Germany. It is organised by Deutsche Bodenkundliche Gesellschaft (German Soil Society). At this meeting UED will represent tempQsim by poster and/or oral presentations.

5.3 Information on additional communication activities of different partners

UHANN (P1)

UHANN executed an intensive information exchange phone, email with all participants during the entire reporting period. Personnel WP-leader co-ordination events have been taken place in the context of the WP2 meeting in Brussels and during the Midterm review meeting. In addition the visit of UHANN at IRSA, TUC and NERC have been used to discuss the progress of the current work and required specifications of future tasks.

With IRSA and IMAR completing the model testing and harmonising the model improvement effort has been discussed in depth.

NERC (P2)

Dr Cooper has recently visited the Vène catchment with M-G Tournoud and J-L Perrin in preparation for modelling the catchment.

TUC (P3)

Design of field work, sampling procedures, and processes identification: Close communication with Nikolaos Skoulikidis (NCMR) and Klement Tockner (EAWAG).

HSPF modelling: Close communication with the Bulgarian and UHANN team

Experience and literature exchange, planning of research and field activities, collaboration for the comprehensive field campaigns, etc. with NCMR:

Collaboration with Dr Bouraoui Faycal from European Commission – general Directorate Joint Research Centre (EC – JRC) – electronic submittal of Krathis GIS data and other information

Collaboration with Dr Mike Kirby from University of Leeds – electronic submittal of Krathis GIS data and other information

Continuous electronic collaboration with Klement Tockner and other tempQsim members on development of experimental protocols.

Matthias Obermann from UHANN and Plammen Ninov from the Bulgarian team participated in an HSPF model workshop offered at the Technical University of Crete.

Four members of the TUC team met with people from NCMR and went to Krathis for the second field campaign activities.

Nikolaos Nikolaidis travelled to Thessaloniki to meet with faculty from Aristotle University on water resources issues.

Nikolaos Nikolaidis travelled to Athens and met with people from NCMR regarding project organisation.

Presentation of the following paper at the International Conference, Protection and Restoration of the environment VII, in Mykonos Greece, 28 June – 1 July 2004: “In stream geochemical processes of temporary rivers – Krathis river case study”, Ourania Tzoraki, Georgios Amaxidis, Nikolaos Skoulikidis, Nikolaos Nikolaidis

EAWAG (P4)

Numerous e-mail and phone contacts were made with other partners within the tempQsim consortium, in particular with partners involved in WP4. A 1-day workshop was held in Cagliari in March 2004 (WP4). Partners of IRSA visited EAWAG to discuss the experimental design of bed-sediment processes.

IMAR (P5)

Providing available and historical data from Degebe watershed with partner: UHANN, NERC, ULEEDS

Software development protocol was provided to all partners

Inter-calibration samples of sediment respiration and bacterial count was discussed with IRSA (Rome)

Denitrification protocol was discussed with UACEG

Biological processes and sediment requirements were discussed with UED

Decomposition experiments (leaf bags) were discussed with NCMR

Frank Braunschweig participated at Harmoni-CA Meeting, 19-20 February 2004.

Ramiro Neves contribution at an Iberian Meeting organised by the Ministries of Environment from Spain and Portugal, Beja, 30-31 March 2004, for discussing the implementation of the Water Framework Directive (WFD). In that talk TempQsim has been presented as source of knowledge for that purpose.

IRSA (P6)

A huge number of both phone and e-mail communication happened between IRSA (which is WP2 co-ordinator) and the Project leader on one side and all the modelling institutions on the other side. These contacts regarded mainly

- the preparation of the 1st Annual report,
- the organisation of the WP2 modelling meeting in Brussels
- the check on the current state of the model implementations

An even bigger number of communications took place between the different IRSA sites and the Hydrocontrol Partners with which a very close co-operation is being carried out. IRSA and Hydrocontrol researcher also meet in three meetings to discuss results from the SWAT application and from the monitoring activity in the Mulargia catchment.

Several contacts took place between the IRSA researchers engaged in WP4 and the EAWAG team. IRSA researchers also visited EAWAG to agree on a common scheme for the experimental setup of the study on sediment dynamics.

Achievements so far reached within the project have been presented in a workshop held at the Basilicata University in Potenza (Italy).

Contacts have been set with the SWAT developers in USA to agree the terms of a closer co-operation in view of forthcoming visit of an IRSA researcher (to take place in august 2004) and of a 3-4 months stage in Temple (TX) of an IRSA PhD student to take place in autumn 2004.

The TempQsim project has been presented to the all-partner annual meeting of the EU EUROHARP project held in Carmona (Spain) in March 2004 where also some tentative agreements were taken on the opportunity of organising a common meeting (Euroharp / TempQsim / EC DG Research).

MSEM (P8)

Dr Cooper (NERC) visited (April 2004) the Vène catchment in preparation for modelling the catchment with CASCADE. ESSEN partner visited the catchment in February to make a sampling campaign.

MSEM team spent two days in Sardinia, after the mid-term meeting for extra-discussion and agreement about the transfer of data.

UACEG (P9)

Visits of other partner institutes – Plamen Ninov from UACEG visited TUC (17.01-24.01.04) to be trained on use of HSPF and to get help in creation of uci file.

NCMR (P10)

All aspects of tempQsim project + common paper (Factors Influencing Inundation Dynamics of Temporary Waters in the Mediterranean Region – Implications to Water Management) were discussed with TUC.

Erosion/ transport/ sedimentation of sediments, organic matter and nutrients (PhD of Y. Amaxidis) were discussed with UESSEN.

Technique for air-photos analysis was discussed with EAWAG.

In-situ processes were discussed with IMAR.

Application of ANSWERS model was discussed with JRC.

Visits of other partner institutes: In March, N. Skoulikidis and Y. Amaxidis visited TUC in order to analyse the data set and prepare the presentation of Krathis catchment for the 3rd project meeting that took place in Sardinia.

HYC (P11)

In order to well organise the work, communications by phone, mail and fax among all partners are always carried out.

Moreover Hydrocontrol staff often visited in Rome IRSA partners with whom it works in a very close collaboration for the activities to carry out in Mulargia study site.

UED (P12)

Planning field trips to Spain, France and Greece

Preparing midterm meeting

GIS-data requirements

Results of sediment analyses of Vène and Albujon

Summary of sediment data were discussed with CEBAS-CSIC, UMII-MSEM, UHANN, EAWAG, IRSA, CEH, NCMR

Visits of other partner institutes: 2004-February: CEBAS-CSIC and Albujon catchment; 2004-March: UMII-MSEM and Vène catchment;

Other meetings e.g. catchment or conference attendant: 2004-March: Hydrocontrol, midterm meeting.

6 Difficulties encountered at management and co-ordination level and proposed/applied solutions

UHANN (P1)

There are no major difficulties at management and co-ordination level encountered. The co-ordination between the workpackages was slightly affected by difficulties on the WP-levels. The requests from the WP leaders for additional information should be answered faster by the partners and with a reduced number of reminders. The Co-ordinator will spend more effort to strengthen the position of the WP leaders, as after the first year also some more understanding of the catchment characteristics will allow a better discussion.

Difficulties in instrumentation will be checked again, in order to use experience from the first year to the second year. A status information on instrumentation will be requested from the WP-leaders by the co-ordinator within the next month.

NERC (P2)

It was originally intended to model the Albujon using CASCADE. Some progress was made here, though the catchment is a difficult one. Some further progress might be made if the catchment owners released new data for the catchment, which are believed to exist. Nevertheless, if data for the Vène are made available, this will be a good alternative to further modelling of the Albujon.

IMAR (P5)

a) Differences between infrastructure and experience between partners:

During the first year of the project differences between partner's background and laboratory organisation have slowed down the project. It has been solved increasing the number of internal meetings, reallocating some tasks and shortening deadlines for providing data to the local co-ordinator.

b) Model limitations: (this is not a management difficulty, but generates some)

Ability of existing models (WP2) for simulating temporary waters is smaller than expected. The most complete models in terms of processes (HSPF and SWAT) are not able to simulate events typical from temporary waters. Other models more adequate to simulate discharge events are not able to simulate water quality processes. This has consequences for WP5, requiring more developments that foreseen at the starting of the project. A more complete set of modules is being developed, including a runoff module with a time step of minutes. This difficulty is obliging to re-organising WP5.

Appendices

Partner within the tempQsim consortium

Partner 1	Fachgebiet Gewaesserguetemodellierung, Universität Hannover (UHANN), Hannover, Germany
Partner 2	Natural Environment Research Council (NERC), Swindon, United Kingdom
Partner 3	Technical University of Crete (TUC), Chania, Greece
Partner 4	Eidgenoessiche Anstalt fuer Wasserversorgung, Abwasserreinigung und Gewaesserschutz (EAWAG), Duebendorf, Switzerland
Partner 5	Institute of Marine Research (IMAR), Coimbra, Portugal
Partner 6	National Research Council of Italy (IRSA), Roma, Italy
Partner 7	Consejo Superior de Investigaciones Cientificas (CSIC), Madrid, Spain
Partner 8	Université Montpellier II – Sciences et Techniques du Languedoc (UMII - JRU 5569 MSEM), Montpellier, France
Partner 9	University of Architecture, Civil Engineering and Geodesy, (UACEG), Sofia, Bulgaria
Partner 10	National Centre for Marine Research (NCMR), Eliniko, Aerolimenas, Greece
Partner 11	Hydrocontrol – Research and Training Centre (HYC), Capoterra, Italy
Partner 12	Universität Duisburg-Essen (UED), Essen, Germany
Partner 13	University of Leeds (ULEEDS), Leeds, United Kingdom
Partner 14	Centre National de la Recherche Scientifique (CNRS - JRU 5569 MSEM), Paris – Cedex , France
Partner 15	Institut de Recherche pour le Developpement (IRD - JRU 5569 MSEM), Paris, France
Partner 16	Commission of the European Communities (EC-JRC), Bruxelles , Belgium

Participants information:

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5	IMAR – Instituto do Mar (IMAR)	Departamento de Zoologia, Largo Marquês de Pompal, Faculdade de Ciências e Tecnologia, Universidad de Coimbra	3004-517	Coimbra	P	Prof.	Neves	Ramiro		+351 917224732		+351 214211272	ramiro.neves@ist.utl.pt
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N°	Institution/ Organisation	Street name and number	Post Code	Town/City	Country Code	Title	Family Name	First Name	Status	Telephone N°	Mobile N°	Fax N°	E-Mail
11	Hydrcontrol Research and Training Centre (HYC)	Strada n.52; Località Poggio dei Pini	09012	Capoterra (CA)	I	Dr.	Diliberto	Ludovica	Permanent	+39 070 723111		+39 070 725478	ludovica.diliberto@andromeda.unica.it
12	Universität Duisburg-Essen (UED)	Universitätsstr. 5	45117	Essen	D	Prof. Dr.	Burghardt	Wolfgang	Permanent	+49 201 183 -3754 /- 3202	-.-	+49 201 183 2390	
13	University of Leeds (ULEEDS)	Woodhouse Lane	LS2 9JT	Leeds	UK	Prof.	Kirkby	Michael J.		+44 113 2333310		+44 113 2333308	mike@geog.leeds.ac.uk
16	European Commission – general Directorate Joint Research Centre (EC – JRC)	Via Enrico Fermi	21020	Ispra	I	Dr.	Bouraoui	Faycal	Permanent	+39 0332 785 173		+39 0332 785601	faycal.bouraoui@jrc.it

Summary on manpower used by workpackages in personmonth (I)

No.	Institution/Organisation		Co	Wp1	Wp2	Wp3	Wp4	Wp5	Sum
1	Universität Hannover (UHANN)	Periode 01.11.03 – 30.04.04 planned	5,5	10,85	3		1	3	23,35
		Periode used 01.11.03 – 30.04.04	6,5	9	2		0,5	3	21
		Total month in year 2 planned	11	22	5		2	6	46
		Total month in 3 years planned	33	74	21	0	4	21	153
2	Natural Environment Research Council (NERC)	Periode 01.11.03 – 30.04.04 planned			3,7			0,6	4,3
		Periode used 01.11.03 – 30.04.04			4,6			1,3	5,9
		Total month in year 2 planned			6			2,6	8,6
		Total month in 3 years planned		2	9,9	0	0	14	25,9
3	Technical University of Crete (TUC)	Periode 01.11.03 – 30.04.04 planned		0,25	1,5	0,25	0,25	3,75	6
		Periode used 01.11.03 – 30.04.04		0,25	1,9	0,25	0,25	3,75	6,4
		Total month in year 2 planned		0,5	3	0,5	0,5	7,5	12
		Total month in 3 years planned		2	15	2	2	15	36
4	Eidgenoessiche Anstalt fuer Wasserversorgung, Abwasser-reinigung und Gewaesserschutz (EAWAG)	Periode 01.11.03 – 30.04.04 planned							0
		Periode used 01.11.03 – 30.04.04	not specified						0
		Total month in year 2 planned							0
		Total month in 3 years planned		16	0	26	58	0	100
5	Institute of Marine Research (IMAR)	Periode 01.11.03 – 30.04.04 planned							0
		Periode used 01.11.03 – 30.04.04		0	8,97	11	3,26	20,4	43,62
		Total month in year 2 planned		0	15	15	7	30	67
		Total month in 3 years planned		8	29	18	15	44	114
6	National Research Council of Italy (IRSA)	Periode 01.11.03 – 30.04.04 planned		1	6,5	1	2,5	2	13
		Periode used 01.11.03 – 30.04.04		0,8	7	0,6	4	1	13,4
		Total month in year 2 planned		2	14	2	5,9	4	27,9
		Total month in 3 years planned		6	35,9	6	12	24	83,9
7	Consejo Superior de Investigaciones Cientificas (CSIC)	Periode 01.11.03 – 30.04.04 planned		0,5	6	8,5		1	16
		Periode used 01.11.03 – 30.04.04		0,7	7	8,3		2	18
		Total month in year 2 planned		1	9	14		8	32
		Total month in 3 years planned		5	36	36	0	21,3	98,3
8	Université Montpellier II – Sciences et Techniques du Languedoc (UMII JRU 5569 MSEM)	Periode 01.11.03 – 30.04.04 planned		0,25	2	4	1,5	6,5	14,25
		Periode used 01.11.03 – 30.04.04		0,2	3,2	5	1,8	6,5	16,7
		Total month in year 2 planned		0,5	4	8	3	13	28,5
		Total month in 3 years planned		2	28	24	7,3	28	89,3
9	University of Architecture, Civil Engineering and Geodesy, (UACEG)	Periode 01.11.03 – 30.04.04 planned		0,8	5	6,8	7	1,9	21,5
		Periode used 01.11.03 – 30.04.04		0,8	5	7	7,5	1,9	22,2
		Total month in year 2 planned		1,5	10	13,6	14,1	3,8	43
		Total month in 3 years planned		5	21	27	29	16	98
10	National Centre for Marine Research (NCMR)	Periode 01.11.03 – 30.04.04 planned		0,5	0,5	11,9	6,2		19,1
		Periode used 01.11.03 – 30.04.04		2,5	0,5	12,5	7,9		23,4
		Total month in year 2 planned		1	1	23,8	12,5		38,3
		Total month in 3 years planned		3	3	45	32	2	85
11	Hydrocontrol - Research and Training Centre (HYC)	Periode 01.11.03 – 30.04.04 planned			4	8			12
		Periode used 01.11.03 – 30.04.04			3,2	8,5			11,7
		Total month in year 2 planned			5,2	19	0,1		24,3
		Total month in 3 years planned		3,8	15	18	9	0	45,8
12	Universitaet Duisburg-Essen (UED)	Periode 01.11.03 – 30.04.04 planned							0
		Periode used 01.11.03 – 30.04.04		0,6			12,7		13,3
		Total month in year 2 planned		1,5			29		30,5
		Total month in 3 years planned		5	0	0	62,9	0	67,9

Summary on manpower used by workpackages in personmonth (II)

13	University of Leeds (ULEEDS)	Periode 01.11.03 – 30.04.04 planned			3	3			6
		Periode used 01.11.03 – 30.04.04			3	3			6
		Total month in year 2 planned			3	3			6
		Total month in 3 years planned		1	11,7	19	0	16	47,7
14	Centre National de la Recherche Scientifique (CNRS - JRU5569 MSEM)	Periode 01.11.03 – 30.04.04 planned							
		Periode used 01.11.03 – 30.04.04	figures included in partner 8						
		Total month in year 2 planned							
		Total month in 3 years planned							
15	Institut de Recherche pour le Developement (IRD -JRU5569 MSEM)	Periode 01.11.03 – 30.04.04 planned							
		Periode used 01.11.03 – 30.04.04	figures included in partner 8						
		Total month in year 2 planned							
		Total month in 3 years planned							
16	Commission of the European Communities (EC - JRC)	Periode 01.11.03 – 30.04.04 planned							0
		Periode used 01.11.03 – 30.04.04	not specified						0
		Total month in year 2 planned							0
		Total month in 3 years planned		1	3	1	0	1	6
		Periode 01.11.03 – 30.04.04 planned	5,5	14,15	35,2	43,5	18,5	18,8	130
		Periode used 01.11.03 – 30.04.04	6,5	**14,85**	**41,8**	**56,1**	**37,9**	**38,6**	**189,2**
		Total month in year 2 planned	11	30	75,2	98,9	74,1	74,9	353,1
		Total month in 3 years planned	33	133,8	229	222	231	202	1018
			Co	Wp1	Wp2	Wp3	Wp4	Wp5	Sum

Summary on manpower used and costs 01.11.03 – 30.04.04 (I)

Manpower in personmonth, costs in 1000 EURO

Participant Role	Participant No	Participant Short Name		Number of personmonths: permanent staff	Number of personmonths: project specific staff	Personnel Costs	Durable Equipment	Subcontracting	Travel and Subsistence	Consumables	Computing	Protection of Knowledge	Other Specific Project Costs	Overhead Costs	Total Costs	Costs Basis
Co	1	UHANN	Co-ordination	3,0	3,5	45,1			0,8					9,2	55,1	AC
			Wp 1		9,0	13,7		31,5	5,8					3,9	54,9	
			Wp 2	2,0										0,0	0,0	
			Wp 4	0,5												
			Wp 5		3,0									0,0	0,0	
			Sum 01.11.03 – 30.04.04	5,5	15,5	58,8	0,0	31,5	6,6	0,0	0,0	0,0	0,0	13,1	110,0	
			Proposal 2. Year	9,7	37,0	164,0	0,0	18,5	16,0	3,3	0,0	0,0	0,0	36,7	238,4	
CR	2	NERC	Wp 1											0,0	0,0	FC
			Wp 2											0,0	0,0	
			Wp5											0,0	0,0	
			Sum 01.11.03 – 30.04.04	5,9	0,0	30,1	0,0	0,0	1,7	0,0	2,4	0,0	0,0	36,4	70,6	
			Proposal 2. Year	8,6	0,0	45,3	0,0	0,0	8,7	0,0	3,0	0,0	0,0	54,8	111,7	
CR	3	TUC	Wp 1	1,0					0,3					0,1	0,4	AC
			Wp 2	1,0	1,0	1,9			1,5					0,7	4,1	
			Wp 3		0,2	0,3			0,3	0,1				0,1	0,8	
			Wp 4		0,2	0,3			0,3	0,3				0,2	1,1	
			Wp 5	0,6	2,4	5,0			3,9					1,8	10,7	
			Sum 01.11.03 – 30.04.04	2,6	3,8	7,5	0,0	0,0	6,3	0,4	0,0	0,0	0,0	2,8	17,0	
			Proposal 2. Year	6,8	5,2	17,4	0,0	0,0	8,3	0,7	0,0	0,0	0,0	5,3	31,7	
CR	4	EAWAG	Wp 1											0,0	0,0	AC
			Wp 3	not specified										0,0	0,0	
			Wp 4											0,0	0,0	
			Sum 01.11.03 – 30.04.04	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
			Proposal 2. Year	9,8	24,4	69,2	0,0	0,0	5,8	7,0	0,0	0,0	0,0	16,4	98,4	
CR	5	IMAR	Wp 1											0,0	0,0	AC
			Wp 2		2,0	7,2			1,7				0,1	1,8	10,8	
			Wp 3	1,0	1,0	5,4	3,8		0,6	0,5			0,6	2,2	13,1	
			Wp 4	1,0						2,7			0,6	0,7	4,0	
			Wp 5	3,0	4,0	14,2		0,1	5,4				0,8	4,1	24,6	
			Sum 01.11.03 – 30.04.04	5,0	7,0	26,8	3,8	0,1	7,6	3,2	0,0	0,0	2,1	8,7	52,3	
			Proposal 2. Year	6,7	31,1	47,4	0,0	4,5	11,0	10,0	0,0	0,0	3,0	14,3	90,2	
CR	6	IRSA	Wp 1		0,8	3,2			1,5				3,0	2,6	10,3	FF
			Wp 2		7,0	28,0			3,1					22,4	53,5	
			Wp 3		0,6	2,4								1,9	4,3	
			Wp 4		4,0	16,0			2,4	2,4				12,8	33,6	
			Wp 5		1,0	4,0								3,2	7,2	
			Sum 01.11.03 – 30.04.04	0,0	13,4	53,6	0,0	0,0	7,0	2,4	0,0	0,0	3,0	42,9	108,9	
			Proposal 2. Year	0,0	27,9	114,2	0,0	20,0	18,1	10,0	0,0	0,0	0,0	91,3	253,6	
CR	7	CSIC	Wp 1		0,7	1,2			3,0					1,0	5,2	FF
			Wp 2		7,0	17,3				0,5				13,8	31,6	
			Wp 3		8,3	21,0			3,0	1,2				16,8	42,0	
			Wp 5		2,0	4,9								4,0	8,9	
			Sum 01.11.03 – 30.04.04	0,0	18,0	44,5	0,0	0,0	6,0	1,7	0,0	0,0	0,0	35,6	87,8	
			Proposal 2. Year	0,0	32,5	72,5	0,0	0,0	4,7	2,0	0,5	0,0	0,0	58,0	137,7	
CR	8	UMI - JRU 5569 MSEM	Wp 1	0,1					3,2					0,6	3,8	AC
			Wp 2	0,7	1,5	3,9				0,9				1,0	5,7	
			Wp 3	0,5	2,0	3,9			0,4	2,3				1,3	7,9	
			Wp 4		1,5	3,9			0,3	0,8				1,0	5,9	
			Wp 5	0,5	4,0	11,6				1,9				2,7	16,1	
			Sum 01.11.03 – 30.04.04	1,8	9,0	23,2	0,0	0,0	3,8	5,9	0,0	0,0	0,0	6,6	39,5	
			Proposal 2. Year	4,0	12,9	33,9	0,0	0,0	8,0	15,9	0,0	0,0	0,0	11,6	69,3	

Summary on manpower used and costs 01.11.03 – 30.04.04 (II)

Manpower in personmonth, costs in 1000 EURO

Participant Role	Participant No	Participant Short Name		Number of personmonths: permanent staff	Number of personmonths: project specific staff	Personnel Costs	Durable Equipment	Subcontracting	Travel and Subsistence	Consumables	Computing	Protection of Knowledge	Other Specific Project Cos	Overhead Costs	Total Costs	Costs Basis
CR	9	UACEG	Wp 1	0,6	0,2	0,1								0,0	0,1	AC
			Wp 2	3,0	2,0	1,3			1,4					0,5	3,2	
			Wp 3	2,5	4,5	2,9		0,4	1,8	0,2				1,0	6,3	
			Wp 4	2,0	5,5	3,6			1,7	0,1				1,1	6,5	
			Wp 5	0,9	1,0	0,7			1,5					0,4	2,6	
			Sum 01.11.03 – 30.04.04	9,0	13,2	8,6	0,0	0,4	6,4	0,3	0,0	0,0	0,0	3,1	18,8	
			Proposal 2. Year	18,0	25,0	16,2	0,0	2,0	10,1	6,0	0,0	0,0	0,0	6,5	40,8	
CR	10	NCMR	Wp 1	1,5	1,0	7,3			2,9	0,1				6,4	16,8	FC
			Wp 2		0,5	0,9								0,8	1,6	
			Wp 3	5,7	6,8	20,2		0,6	2,8	4,1			0,9	17,6	46,2	
			Wp 4	3,9	4,0	12,7			1,5	0,5			0,1	11,1	25,9	
			Wp 5											0,0	0,0	
			Sum 01.11.03 – 30.04.04	11,1	12,3	41,1	0,0	0,6	7,3	4,8	0,0	0,0	1,0	35,8	90,6	
			Proposal 2. Year	0,0	38,3	83,4	0,0	2,4	10,8	17,7	1,8	0,0	0,0	72,7	188,7	
CR	11	HYC	Wp 1											0,0	0,0	FF
			Wp 2		3,2									0,0	0,0	
			Wp 3		8,5				1,9	0,5				0,0	2,4	
			Wp 4											0,0	0,0	
			Sum 01.11.03 – 30.04.04	0,0	11,7	39,4	0,0	0,0	1,9	0,5	0,0	0,0	0,0	31,5	73,3	
			Proposal 2. Year	0,0	24,3	62,2	0,0	1,8	3,7	1,3	0,0	0,0	0,0	49,7	118,7	
CR	12	UED	Wp 1	0,0	0,6	2,2			0,6	0,0	0,0	0,0	0,0	0,6	3,4	AC
			Wp 4	1,1	11,6	27,9	5,0		6,8	2,5	0,0	0,0	0,0	8,4	50,6	
			Sum 01.11.03 – 30.04.04	1,1	12,2	30,1	5,0	0,0	7,4	2,5	0,0	0,0	0,0	9,0	54,0	
			Proposal 2. Year	8,9	6,1	64,4	0,0	0,0	8,5	9,2	0,0	0,0	0,0	16,4	98,4	
CR	13	ULEEDS	Wp 2	1,0										0,0	0,0	AC
			Wp 3	1,0										0,0	0,0	
			Wp 5											0,0	0,0	
			Sum 01.11.03 – 30.04.04	2,0	0,0	0,0	0,0	0,0	2,9	0,0	2,0	0,0	0,0	1,0	5,9	
			Proposal 2. Year	6,7	5,3	41,7	0,0	0,0	11,4	1,7	0,0	0,0	0,0	11,0	65,8	
CR	14	CNRS - JRU 5569 MSEM	Wp	1,8	0,0	6,2								5,0	11,2	FF
			Sum 01.11.03 – 30.04.04	1,8	0,0	6,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	5,0	11,2	
			Proposal 2. Year	0,0	2,6	12,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	9,8	22,0	
CR	15	IRD - JRU 5569 MSEM	Wp	4,1	0,0	15,5								12,4	27,9	FF
			Sum 01.11.03 – 30.04.04	4,1	0,0	15,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	12,4	27,9	
			Proposal 2. Year	0,0	5,0	23,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	18,8	42,3	
CR	16	EC - JRC	Wp 1											0,0	0,0	FC
			Wp 2											0,0	0,0	
			Wp 3	not specified										0,0	0,0	
			Wp 5											0,0	0,0	
			Sum 01.11.03 – 30.04.04	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
			Proposal 2. Year	0,0	2,7	23,1	0,0	0,0	4,8	0,0	0,0	0,0	0,0	11,8	39,6	
		sum	Sum 01.11.03 – 30.04.04	49,9	116,1	385,3	8,8	32,6	64,9	21,7	4,4	0,0	6,1	243,8	767,6	
			Proposal 2. Year	79,0	280,4	890,6	0,0	49,2	129,8	84,7	5,3	0,0	3,0	484,9	1647,4	

List and schedule of deliverables

	deliverable/report	month	deadline
D 1.1	Manual of agreed protocols, harmonised procedures for data collection, quality control and archiving, field work and programming	2	31.12.02
D 1.2 (1)	Central database, web and communication Service	6	30.04.03
D 1.3 (1)	Reports from Steering Committee meetings, Advisory Board meetings, Workflow monitoring reports, Workshops proceedings	6	30.04.03
D 2.1	Quality-checked, existing data from the case study sites	8	30.06.03
D 3.1 (1)	Data archive for calibration of water quality models incl. Q (t,x), C (t,x)	9	31.07.03
D 4.1 (1)	Data archive for calibration in microbiological turnover rates of channel bed processes, incl. C (t,x), k (t,x)	9	31.07.03
D 1.3 (2)	Reports from Steering Committee meetings, Advisory Board meetings, Workflow monitoring reports, Workshops proceedings	12	31.10.03
D 2.2 (1)	Test results of existing, unmodified models	14	31.12.03
D 5.3 (1)	Improved versions selected catchment models (to WP2)	14	31.12.03
D 5.2	Interface between modules and the catchment models	18	30.04.04
D 1.3 (3)	Reports from Steering Committee meetings, Advisory Board meetings, Workflow monitoring reports, Workshops proceedings	18	30.04.04
D 2.2 (2)	Test results of existing, unmodified models	20	30.06.04
D 3.1 (2)	Data archive for calibration of water quality models incl. Q (t,x), C (t,x)	21	31.07.04
D 4.1 (2)	Data archive for calibration in microbiological turnover rates of channel bed processes, incl. C (t,x), k (t,x)	21	31.07.04
D 5.1	TempQsim modules (stream, infiltration, water quality, sediment di-agenesis) (using D 2.2, D 3.1, D 4.1)	22	30.06.05
D 1.3 (4)	Reports from Steering Committee meetings, Advisory Board meetings, Workflow monitoring reports, Workshops proceedings	24	31.10.04
D 1.3 (5)	Reports from Steering Committee meetings, Advisory Board meetings, Workflow monitoring reports, Workshops proceedings	30	30.04.05
D 2.3	Test results of models modified with tempQsim modules	32	30.06.05
D 4.1 (3)	Data archive for calibration in microbiological turnover rates of channel bed processes, incl. C (t,x), k (t,x)	33	31.07.05
D 3.1 (3)	Data archive for calibration of water quality models incl. Q (t,x), C (t,x)	35	30.09.05
D 1.2 (2)	Central database, web and communication Service	36	31.10.05
D 3.2	Documentation of spatial and temporal variability of hydrology and water quality dynamics in temporary waters (with WP2, WP3)	36	31.10.05
D 4.2	Documentation of spatial and temporal variability of channel bed proc-esses in temporary waters (with WP2, WP3)	36	31.10.05
D 1.3 (6)	Reports from Steering Committee meetings, Advisory Board meetings, Workflow monitoring reports, Workshops proceedings	36	31.10.05
D 5.3 (2)	Improved versions selected catchment models (to WP2)	36	31.10.05
D 2.4	Guidelines for model application to temporary waters and support in the development of management plans (Using D 2.2, D 2.3, D 3.2, D 4.2)	36	31.10.05
D 1.4	Final report	38	31.12.05