FCT Fundação para a Ciência e a Tecnologia

MINISTÉRIO DA EDUCAÇÃO E CIÊNCIA

Concursos de Projectos de I&D

Calls for R&D Projects

Voltar à descrição do projecto
Back to project description

Imprimir esta página
Print this page

Visão global da candidatura

Application overview

Ocultar todos as secções desta candidatura
Hide all sections for this application [–]

Referência do projeto
Project reference
EXPL/GEO-MET/1422/2013 **(Lacrado a 02-07-2013 às 16:49)**

1. Identificação do projeto

1. Project description [–]

Domínio Científico
Scientific Domain
Ciências Naturais e do Ambiente

Área científica principal
Main Area
Geociências - Meteorologia e Clima

Área científica Secundária
Secondary area
Ambiente e Alterações Globais - Modelação e Avaliação Ambiental

Acrónimo
Acronym
ALEX

Título do projeto (em português)
Project title (in portuguese)
ALEX: Campanha de Observações hidro-meteorológicas em Alqueva

Título do projeto (em inglês)
Project title (in english)
ALEX: ALqueva hydro-meteorlogical EXperiment

Financiamento solicitado
Requested funding
49.812,00€

Palavra-chave 1
fluxos de CO2

Keyword 1
eddy covarience

Palavra-chave 2
balanço de energia à superfície

Keyword 2
surface energy budget

Palavra-chave 3
evaporação

Keyword 3
evaporation

Palavra-chave 4
lake modelling

Keyword 4
lake modelling

Data de início do projeto
Starting date
01-01-2014

Duração do projeto em meses
Duration in months
12

2. Instituições envolvidas
2. Institutions and their roles

–

Instituição Proponente
Principal Contractor

Universidade de Évora (UE)
Largo dos Colegiais, 2 - Apartado 94
7002-554Évora

Descrição da Instituição
The University of Évora it is organized in schools: Arts, Sciences and Technology, Social Sciences and Health. The University offers 33 undergraduate and 41 postgraduate degrees.
Research and Development (R&D) is organized in several areas through a network of 14 Research Units all of them submitted to international evaluation and under the global coordination of Institute for Research and Advanced Education. The main goal is to aim all R&D efforts to look forward to direct appliance in the society contributing to its sustainability. For that, research activities are managed on a multi-disciplinary and inter-departmental basis or around specific programs and projects, in order to take advantage of the synergies and articulations between different areas.
The main R&D areas are: Agronomy and Biodiversity; Geophysics, Environment and Landscaping; Materials and Surface Science; Economics and Management; Computer Sciences and Software Interoperability; Social and Political Sciences, History, History of Art, Science and Cultures; Applied Mathematics; Education; Literature; Elderly Healthcare
Among over 250 running R&D projects, most are developed within international and national partnerships, by financial programs like 7ht Framework Program, Social European Fund and National Science Foundation as also private sponsorship.
Above the mentioned the University of Evora has two Chairs in excellence areas, biodiversity and Renewable Energies sponsored by private enterprises.

Instituição Participante
Participating Institution

Empresa de Desenvolvimento e Infra-estruturas do Alqueva, SA (EDIA)
Rua Zeca Afonso 2
7800-522Beja

Descrição da Instituição
Com sede em Beja, centro da região beneficiária do Empreendimento de Fins Múltiplos de Alqueva (EFMA), a EDIA é a primeira sociedade anónima de capitais exclusivamente públicos, sediada no interior do País.

Na sua orientação estratégica, a EDIA definiu como eixos prioritários o aproveitamento do EFMA assente no recurso "Água", no aumento da produção e rentabilização dos investimentos nas infraestruturas criadas, visando o êxito do Projeto.

Contribuindo para o desenvolvimento, não só da região, mas também do País, a EDIA, enquanto Empresa gestora do EFMA e responsável por um instrumento relevante para dinamização da economia, posiciona-se como uma referência estratégica no contexto regional e nacional.

A EDIA, como empresa fortemente ligada ao Alentejo, tem nos seus quadros mais de dois terços de efetivos naturais da região, contribuindo ainda, de forma significativa, para o desenvolvimento curricular dos estudantes da região.

Unidade de Investigação
Research Unit

Centro de Geofísica (CG/UE)
Rua Romão Ramalho, 59
7000-671Évora

Unidade de Investigação Adicional
Additional Research Unit
(Vazio)

(Void)

Instituição de Acolhimento
Host Institution
(Vazio)
(Void)

3. Componente Científica
3. Scientific Component

3.1. Sumário
3.1 Abstract

3.1.a Em português
3.1.a In Portuguese

O objectivo do projecto é realizar uma campanha observacional em Alqueva (ALEX 2014), incluindo observações da coluna de água, da coluna atmosférica, e da interface água-ar. A equipa propõe-se efectuar uma campanha integrada com medições de parâmetros químicos, físicos e biológicos. Com a campanha pretende-se potenciar a utilização de equipamento científico existente, nomeadamente pertencentes ao CGE, incluindo os novos equipamentos que estão a ser adquiridos no âmbito do Laboratório de Ciências e Tecnologias da Terra, Atmosfera e Energia (Inalentejo / QREN).
Para além dos membros da equipa, irão ser desafiados a participar na campanha outros investigadores, disponibilizando os seus meios e partilhando os dados.

As observações realizadas darão origem a uma base de dados inter-disciplinar de grande utilidade para as várias equipas que trabalham em Alqueva, para os membros da equipa, mas também da comunidade científica nacional. Esta base de dados incluirá para além das medições efectuadas pelo aparato experimental montado especificamente para o efeito, as resultantes de outras observações efectuadas em contínuo por outras entidades como a APA (ex-INAG), o IPMA e o CGE, bem como informação de detecção remota por satélite.

A campanha de observações incluirá:

Atmosfera
-perfis verticais, obtidos por medições com o microwave profiler para a temperatura e humidade, em aquisição pelo CGE e por radiosondagens
-Composição da atmosfera: aerossóis e gases
-Grandezas meteorológicas junto à superfície
-Radiação solar global e directa (com o sun tracker)

Interface água-ar
-fluxos de momento linear, energia, H2O e CO2 sobre a água
-Balanço energético na superfície

Coluna de água:
-perfis de temperatura da água
-perfis de oxigénio dissolvido, etc..
-turbidez e profundidade do disco de secchi
-perfis do espectro da radiação solar descendente, para o cálculo do coeficiente de atenuação da luz na água
-cianobactérias, algas,

A equipa responsável pelo projecto inclui investigadores experimentados em observação meteorológica, física da atmosfera e qualidade da água (Salgado e Le Moigne, 2010, Potes et al., 2011 e 2012, Rosado et al., 2012, Costa et al., 2006). A realização da campanha de observações aproveita a experiência obtida na campanha THAUMEX 2011 (Le Moigne et al., 2013). A participação da EDIA no projecto é uma garantia de que a sua realização poderá ser de utilidade prática na melhoria da gestão ambiental da Albufeira.

De entre as medições a efectuar, salientam-se por serem pouco comuns:
-medições utilizando o novo sensor IRGASON, que integra um anemómetro sónico e um analisador de CO2 e H2O, da evaporação, do fluxo de CO2 e dos fluxos de momento linear e energia sobre a superfície de água. Existem no mundo poucas medições sobre lagos como evidenciado por Nordbo et al. (2011).

-perfis com o novo equipamento microwave profiler que serão confrontados com os obtidos por radiosondagens. A nosso conhecimento, este é o primeiro microwave profiler existente no país pelo que a sua validação / calibração tem um interesse próprio.

-perfis da radiação solar global espectral adentro de água. Estas medições serão efectuadas com o aparato desenvolvido pela equipa e descrito em Potes et al. (2013), que será melhorado com a aquisição do receptor hemisférico no âmbito deste projecto. A realização destas medições permite estimar o coeficiente de atenuação que é um parâmetro físico relevante na modelação numérica da interacção água-atmosfera. A medição simultânea dos perfis radiativos e dos perfis da temperatura, do oxigénio dissolvido e de outros parâmetros químicos e biológicos trará novos dados para o estudo da dinâmica e da energética da coluna de água.

-Radiação directa utilizando um pirheliómetro com um sun tracker. Para além do interesse destas medições no estudo das transferências radiativas entre a água e a atmosfera, os dados fornecidos pelo pirhéliómetro serão muito úteis na avaliação da irradiação directa normal (DNI), um parâmetro de de grande importância para a tecnologia dos concentradores solares, tecnologia em teste na região.

-Entre os elementos biológicos, as diatomáceas serão analisados com particular atenção, uma vez que os estudos sobre as diatomáceas planctônicas de reservatórios são raros.

A base de dados será útil designadamente para:
-Apoiar à gestão da albufeira;
-A calibração de modelos de lago – em particular sobre o Flak (Mironov et al., 2010)
-Melhorar a parametrização dos lagos na previsão do tempo
-A validação de simulações 3D na atmosfera em modo de mesoscala ou de LES
-Avaliar dos efeitos de Alqueva no clima da região, prosseguindo os trabalhos do PI (Salgado, 2006)
-Caracterizar a camada limite atmosférica
-desenvolver algoritmos para a monitoração da qualidade da água a partir de informação satélite
-Caracterizar recursos energéticos: solar (global e DNI) e eólico
-Estimativa de fluxos de CO2 sobre uma albufeira;
-Balanço hídrico e energético da albufeira

3.1.b Em inglês

3.1.b In English

The aim of the project is to perform an observational Experiment in Alqueva (ALEX 2014), including measurements in the water and in the air columns, and over the water-atmosphere interface. The team proposes to undertake an integrated field campaign with measurements of chemical, physical and biological parameters. Through the campaign, we intend to take advantage of existing scientific, especially those belonging to the CGE, including new equipment being purchased under the Inalentejo/QREN project “Laboratory Sciences and Technologies of Earth, Atmosphere and Energy”.
In addition to the team members, other researchers will be challenged to participate in the observation campaign, offering their resources and sharing data.
The observations will result in a inter-disciplinary database useful for the researchers working on Alqueva, not only for the team members, but also for the national scientific community. This database will include in addition to the measurements made by the experimental apparatus specifically et up for this purpose, others arising from other observations made continuously by other organizations such as the APA (former INAG), the IPMA and the CGE, as well as information from remote sensing satellite.

The observation campaign include:
Atmosphere
-Vertical profiles obtained by measurement with the microwave profiler in acquisition by CGE and by radiosondes
-Atmospheric composition: aerosols and gases
-Near surface meteorological conditions
-Global and direct solar radiation (using the sun tracker)

Air-water interface
momentum, energy, H2O and CO2 turbulent fluxes over the water (eddy covarience measurements)
Surface-energy balance

Water column:
-Water temperature profiles
-characterization of biological elements present in the water column, including phytoplankton, cyanobacteria and diatoms.
- Dissolved oxygen and other chimical profiles,
-Turbidity and Secchi disk dept
-Profiles of the downward solar radiation spectrum which enable the computation of the attenuation coefficient of light in water

The project team includes researchers with experience in meteorological, atmospheric physics and water quality measurements (e.g. Salgado and Le Moigne, 2010; Potes et al., 2011 and 2012; Rosado et al., 2012; Costa et al., 2006) . The ALEX 2014 experiment takes advantege of the experience gained in the the THAUMEX 2011 (Le Moigne et al., 2013). The participation of the EDIA in the project is a guarantee that theirr achievement may be useful in the improvement of the environmental management of the reservoir.

Among the measurements to perform, we highlight some of the less common:
Eddy covariance measurements, using the new IRGASON Integrated CO2 and H2O Open-Path Gas Analyser and 3D Sonic Anemometer, of evaporation, CO2 and energy fluxes. Worldwide, there are few reported measurements over lakes as evidenced by Nordbo et al. (2011).

-Profiles with the new microwave profiler, that will be confronted with those obtained by the radiosondes. To our knowledge, this is the first microwave profiler in the country so its validation has a particular interest.

-Profiles of the spectral solar radiation inside water. These measurements are carried out with the apparatus developed by team members and described in Potes et al. (2013), which will be improved. These measurements allows estimating the attenuation coefficient, which is a relevant physical parameter in numerical modelling of water-air transfers. Simultaneous measurement of radiative profiles and of temperature, oxygen and other chemical and biological parameters will lead new data for water column energy and the dynamics studies.

- Direct solar radiation using a pyrheliometer and a sun tracker. In addition to the interest on the radiative transfer between the water and the atmosphere, the data provided by the pyrheliometer will be very useful in assessing the direct normal irradiation (DNI) a parameter of great significance to the solar concentrators technology, being tested in the Alentejo region.

-Among biological elements, diatoms will be analysed more attentively, since studies on planktonic diatoms of reservoirs are rare and several taxa can form colonies as an adaptation to the planktonic life.

This database shall be usefull in order to:
-Support the management of the reservoir;
- calibrate lake models - in particular the Flake (Mironov et al. 2,010)
-Improve parametrization of lakes in numerical weather prediction
-Validate 3D atmospheric simulations in mesoscale and LES modes
- Re-assess the effects of climate Alqueva in the region, continuing the previous work of the PI (Salgado, 2006)
- characterize the atmospheric boundary layer
-develop and calibrate algorithms for satellite monitoring of water quality
- characterize energy resources: solar (global and DNI) and wind
- obtain CO2 outgassing estimates
- compute the Energy-and the water balance of the reservoir

3.2. Descrição Técnica
3.2 Technical Description

3.2.1. Revisão da Literatura
3.2.1. Literature Review

In February 2002, the lock gates of the new Alqueva dam in the Guadiana River (South Portugal), were closed, beginning a water reservoir that, when filled, cover an area of 250 km2. It is the largest West European artificial lake.
Although many scientific studies have been conducted in Alqueva (e.g. Salgado and Le Moigne, 2010), starting with environmental impact studies prior to construction of the dam, there has been no Hydro-Meteorological Experimental that have measured simultaneously a wide range of meteorological, hydrological and biological parameters in the column of water, in the adjacent atmosphere and especially in the interface.
For example, the direct carbon exchange with the atmosphere, the so-called outgassing, has been recognized to be a significant component in the global carbon budget there are very few experimental studies about it (Vesala et al., 2012). In 1999, Anderson et al. concludes: “In view of the uncertainty in predicting lake-atmosphere CO2 transfer and its important global implications in air-water exchange, we strongly encourage other investigators to make comparative measurements of CO2 flux in an effort to better understand and quantify the environment controls regulating air-water gas transfer”. After 14 years, we still must agree with this statement.
The eddy covariance (EC) technique is an indispensable tool for directly assessing the fluxes from lakes (Vesala et al., 2012).
On other hand, It is known that lakes affect the structure of the atmospheric boundary layer and therefore the weather and the climate on a variety of scales. For Alqueva, a study was conducted by the PI (Salgado,2006), using the MesoNH model (Lafore et al.,1998) where the impacts of the Alqueva lake were shown to depend on the water temperature. The effect of climate variability on thermal structure, water quality, and aquatic ecosystems is also long known to be important. In order to understand the role of lakes on weather and climate, fully coupled models must be developed in which key lacustrine processes relevant have to be represented.
The interest in the 1D modelling of temperature in lakes has recently been revitalized. Two major reasons are responsible for this. First, high horizontal resolution of the modern atmospheric models requires adequate resolution of the heat and mass fluxes at the surface. The second problem is connected to climate studies and consists in the necessity of reliable lake temperature structure for estimation of the lake ecosystem response to global warming. Both regional weather prediction systems and lake ecosystem models are quite complex and computationally expensive, so that the 1D lake models combining computational efficiency with physical soundness may be the best actual choice.
The lake model FLake (Morinov,2010) enjoys growing popularity in NWP (e.g. Balsamo et al., 2012) and climate models as well as in limnology.
For fully reliable climatic calculations, a long-term scenario for phytoplankton dynamics is required, in order to provide trustworthy results on climatic temperature trends. The Inclusion of biochemistry processes in lake models as part of NWP systems may appear in the near future. Biochemistry lake processes as part of NWP and climate models could be introduced via e.g. SURFEX (Masson et al., 2012).
The CGE team has dedicated many research efforts in the field of satellite remote sensing applied to the Earth’s surface and atmosphere (e.g. Costa,2006). namely to the water quality, specifically in Alqueva reservoir, demonstrating the great capability of multi-spectral medium spatial resolution satellite sensors to monitor the quality of inland waters (Potes et al.,2011, 2012). The study of surface water properties from satellite remote sensing techniques requires the correction for the effects of the atmosphere (Potes et al., 2011).
The supply of solar energy into the upper layers of water masses is subject to fluctuations that affect several processes in the photic zone, including photosynthetic processes and subsequently the phytoplankton communities (e.g. Wozniak, 2003). Some instrumentation was developed to measure the underwater radiance. Recently Antoine et al. (2013) developed a new instrument to measure underwater multi-spectral radiance and Potes et al. (2013, in review) developed a new apparatus composed by an optical cable attached to a portable spectroradiometer. This device allows measurements in all types of waters, with the advantage of providing spectral measurements. It performs measurements of downwelling radiance and estimates of the attenuation coefficient. This coefficient is relevant in the water surface layer energy budget and for the representation of lakes in NWP models. In particular, results from Potes et al. (2012) in Alqueva reservoir show that the surface temperature is very sensitive to it.
Reliable estimates of evaporation from lakes and reservoirs are essential for the definition of optimal policies concerning reservoirs. Recently Rodrigues(2009) has identified and test several robust methodologies for the computation of evaporation.
Studies on the use of freshwater algae for ecological assessment are frequent worldwide and mainly in European watercourses, especially since the implementation of the Water Framework Directive. In Portugal several studies have assessed ecological status based on biological elements, algae included.However, the study of the performance of diatoms in ecological assessment in Portuguese reservoirs is limited to Novais et al. 2012, who proved that benthic littoral diatoms could be useful in the ecological status assessment of reservoirs.

The understanding and predicting the complex interactions between climate, hydrology and water quality is important to fulfil the requirements of the UE Water Framework Directive. This issue will be considered on the basis of the experience gained by the team on water quality monitoring (e.g. Morais et al, 2007; Serafim et al.2006).

3.2.2. Plano e Métodos

3.2.2. Plan and Methods

s noted earlier, the objective of the project is to conduct an hydro-meteorological experimet in Alqueva: ALEX 2014. The detailed design and planning of the ALEX measurement campaign will be the first task of vthe project. The first task also includes the testing and calibration of equipment.
It is envisaged that the experience arises during the spring / summer and lasts about 3 months. During this period a set of continuous measurements of several parameters will be performed, including the energy fluxes (radiative and sensible and latent heat), CO2 and H2O on the reservoir as well as the thermal profiles of the water column and common near surface meteorological variables (temperature, humidity, wind, precipitation and pressure). In the same period the CGE meteorological stations and other equipment installed in the station will have its own program of observation integrated in the campaign.
During the experiment period, several observations will be made on a weekly basis, including, water column profiles of chemical and biological elements, measurements of turbidity and the spectral irradiance at different depths.
An Intensive Observation Period of 3 days will be held, during which, in addition to those measures, the atmosphere will be characterized by the release of meteorological balloons with radiosondes.

The experimental work will take place at the Alqueva Reservoir, where many of the team members has been involved in research or monitoring activities. New direct measurements of evaporation and CO2 surface fluxes at the reservoir will be obtained by the means of eddy correlation systems, which will be deployed in the floating meteorological stations already established at the Alqueva reservoir
.
The surface temperature may be estimated from infrared satellite spectral measurements located in spectral atmospheric windows where gas absorption is weak. In this way the atmospheric correction can be accounted for with minimum uncertainties and the surface characterized in terms of its temperature. As for the water turbidity, it will be estimated using spectral visible satellite measurements in combination with in situ measured values. The algorithms developed in this way can then be used to extend the temporal and spatial coverage of the water turbidity and will be used to correctly initialize lake models parameters. Validation of the satellite retrievals is imperative and will be achieved through measurement campaigns of the water leaving spectral radiance/reflectance with a spectroradiometer already available to the team. Underwater spectral radiation profile measurements are of paramount importance for model initialization, and is planned to be done in the measurement campaigns.
The apparatus exploited in this work was developed by Potes et al. (2013, in review) and is composed of a portable spectroradiometer, linked to an optical fiber bundle driven by a customized frame to protect the optical cable and to keep the tip pointing to the zenith direction in underwater environment. The portable FieldSpec UV/VNIR Spectroradiometer from Analytical Spectral Devices Inc. (Boulder, CO, USA) was used to record the spectral downwelling zenith radiance measured across the spectral range 325-1075 nm with a spectral resolution ranging from 1 to 3 nm for the UV and NIR spectral regions respectively. The integration time varies from 17 ms to several minutes depending on the intensity of the incoming radiation. The optical cable was chosen to meet the optical features of the spectroradiometer. The light guide has a numerical aperture of 0.11 resulting in a field-of-view (FOV) of 22º and the core is made of quartz, aiming to carry out measurements in the UV spectral region as well. In order to maximize the signal reaching the spectrometer, the interspacing of the optical fibres in the bundle is minimized using fibres of two different diameters (0.22 and 0.11 mm). The frame was developed with one teflon polymer protecting the cable tip and three layers of PVC (Polyvinyl Chloride) tube protecting the cable from high twist angles with diameters of 16, 20 and 40 mm. The frame was developed to guarantee the verticality and horizontality of the bare tip of the optical cable, which has to point upwards to the zenith in order to collect the downwelling zenith radiance at several levels below the water surface
With this apparatus the following measurements will be performed:
Under Water
1 – Spectral downwelling radiance with the device developed by Potes et al, 2013
2 – With an inwater cosine receptor it is possible to have the spectral downwelling irradiance also with the device developed by Potes et al, 2013 (Lewis et al., 2011)
Above Water
1 – Spectral reflectance of water surface with the spectralon reference panel (Potes et al., 2012)
2 – Simultaneous spectral downwelling irradiance and spectral upwelling radiance to obtain the reflectance of surface (Lawson et al, 2006)

Eutrophication is the process whereby water bodies become enriched by nutrients (Phosphorus and Nitrogen) from both external and internal sources. One of the most detrimental consequences of eutrophication is the development of cyanobacteria, a group of photosynthetic prokaryotic organisms which can produce “blooms”. Blooms are events of explosive growth, which occur mainly during the summer and early autumn months (Reynolds, 1987). Vincent et al. (2004) refer that reliable monitoring of the blooms cannot be done using conventional methods (analyzing water samples from a few sparse measuring stations) is big systems, because blooms are extremely patchy. Satellite remote sensing measurements of lake/reservoir colour provide a tool complementary to in-situ measurements for algal bloom monitoring. Becker et al. (2006) claimed that remote sensing techniques can be extensively used for studying the environment. The individual phytoplankton pigments are characterized by their unique light absorption features. This property allows detection and identification of algal blooms by remotesensing techniques (Cullen et al., 1997).In selected key sites that represent both, tributaries and the lacustrine zone, vertical profiles will be made for temperature, pH, redox and conductivity. Simultaneously, water samples for chemical analysis will be collected at two depth levels (surface and bottom).
The biological elements present in the water column will be characterized in detail. This means that phytoplankton assemblages will be identified until the lowest taxonomical level. Special detail will be given to cyanobacteria, due to the capacity of some species to produce toxins under certain environmental conditions. Also diatoms will be analysed more attentively, since studies on planktonic diatoms of reservoirs are rare and several taxa can form colonies as an adaptation to the planktonic life. It has already been proved that littoral epilithic diatoms could be useful in the environmental assessment of reservoirs, nevertheless, planktonic diatom assemblages could also be tested to understand their indicator value.
A comparison between littoral and planktonic diatom assemblages could be performed, to verify the hypothesis that these approaches are complementary. To do so, benthic littoral diatoms could be sampled from some sites in the margins of the reservoir; artificial substrates could also be placed in the middle of the reservoir, at different depths; furthermore, planktonic diatoms could be sampled from the water column.

The Project will collect a database with all available observations taken at Alqueva by different institutions (APA, IPMA and EDIA). A number of new specialized observations will be performed, including direct over-lake measurements of evaporation by eddy-correlation systems, continuous measurement of biochemical parameters, and innovative measurements of the profiles of water transparency.

3.2.3. Tarefas
3.2.3. Tasks

Lista de tarefas (3)
Task list (3)

Ordem Order	Designação da tarefa Task denomination	Data de início Start date	Data de fim End date	Duração Duration	Pessoas * mês Person * months
1	Experiment design and planning	01-01-2014	31-05-2014	5	13,4

Descrição da tarefa e Resultados Esperados
Task description and Expected results

This task includes all the planning and the design of the ALEX experiment, namely the selection of measurements sites, equipments and sensors, sampling and recording frequency and the.The schedule of experiment will also be established at this stage
This task also includes the test and the calibration of the scientific equipment to be used.
Special attention will be given to the calibration of solar radiation sensors. We will take advantage of this phase to calibrate multiple sensors in use in Geophysics Centre of Évora. This calibration has, thus, an intrinsic value, allowing to increase the confidence of the CGE database, particularly for its use in the quantification of energy resources.
Given the type of project the whole team participate in this task.

Membros da equipa de investigação nesta tarefa
Members of the research team in this task

(BPD) Bolseiro de Pós-Doutoramento 1; Ana Maria das Neves Conchinha Ramalho Ilhéu Janeiro; António Miguel Faustino Serafim; Maria Helena Batista da Costa Guerreiro de Novais; Maria João Tavares da Costa; Maria Manuela Queiroz Martins Mantero Morais; Miguel Joaquim Fernandes Potes; Paulo Manuel Ferrão Canhoto; Rui Paulo Vasco Salgado;

Ordem Order	Designação da tarefa Task denomination	Data de início Start date	Data de fim End date	Duração Duration	Pessoas * mês Person * months
2	ALEX field measurement campaign	01-06-2014	31-08-2014	3	15,8

Descrição da tarefa e Resultados Esperados
Task description and Expected results

This is the core task of the project: the ALEX 2014 Experiment.
The whole team will be involved in the measurements described in the above sections.

Membros da equipa de investigação nesta tarefa
Members of the research team in this task

(BPD) Bolseiro de Pós-Doutoramento 1; Ana Maria das Neves Conchinha Ramalho Ilhéu Janeiro; António Miguel Faustino Serafim; Maria Helena Batista da Costa Guerreiro de Novais; Maria João Tavares da Costa; Maria Manuela Queiroz Martins Mantero Morais; Miguel Joaquim Fernandes Potes; Paulo Manuel Ferrão Canhoto; Rui Paulo Vasco Salgado;

Ordem Order	Designação da tarefa Task denomination	Data de início Start date	Data de fim End date	Duração Duration	Pessoas * mês Person * months
3	database	01-07-2014	31-12-2014	6	10,4

Descrição da tarefa e Resultados Esperados
Task description and Expected results

In this task the database will be build.
The task includes also data processing and quality controlling.
The writing of a paper about the ALEX Experiment will be done in this stage. The paper should be co-authored by all the participators in the measurement program,

Membros da equipa de investigação nesta tarefa
Members of the research team in this task

(BPD) Bolseiro de Pós-Doutoramento 1; Maria Helena Batista da Costa Guerreiro de Novais; Miguel Joaquim Fernandes Potes; Rui Paulo Vasco Salgado;

3.2.4. Calendarização e Gestão do Projeto
3.2.4. Project Timeline and Management

3.2.4.a Descrição da Estrutura de Gestão
3.2.4.a Description of the Management Structure

The structure of the proposal is defined in 3 different main tasks that identify the major activities of the proposal. Two meetings are planned, one for the beginning of the project and a second before the task2 in order to discuss the ongoing work, issues to be solved and plan the future work. A report will be elaborated in the end of of the project and sent to FCT.
The Responsibilities of the PI of the project are identified as follows:
• Closely verify the progress, milestones and related results of the entire project.
• Be in close contact with the research team.
• Verify the level of existing collaboration and data and information exchange between the partners.
• Assume end responsibilities for the final report.
• Organize the meetings
The project's financial and administrative management is of competence of the Administrative Services of university of Évora through its Office of Contracts Management (Divisão de Gestão de Contratos - DGC). The DGC is organized into two areas: (i) contracts financial and administrative management; (ii) Secretary support to R&D units. It has 10 employees, 4 of which have a degree and speak fluent English and French. They have management experience in several different financial programs as Structural Funds for Development or Portuguese Government, namely 6FP and 7FP.
It is the DGC's main task to fulfill all the necessary operations, administrative support and process preparation towards the execution of R&D Units and Projects budgets. It is also of its concern the execution of all legal and required financial reports.

3.2.4.b Lista de Milestones
3.2.4.b Milestone List

Data Date	**Designação da milestone** Milestone denomination
01-04-2014	Conclusion of the experiment planning

Descrição
Description

The design and the schedule of the experiment should be closed 3 months after the beginning of the project.

Data Date	**Designação da milestone** Milestone denomination
15-05-2014	test and calibration of the equipment

Descrição
Description

All the equipment to be used in the ALEX experiment should be tested and calibrated if necessary.

Data Date	**Designação da milestone** Milestone denomination
30-09-2014	end of the field campaign

Descrição
Description

All the measurements should be done before the end of September

Data Date	**Designação da milestone** Milestone denomination
01-12-2014	Paper submission

Descrição
Description

the main paper from the Experiment, with all team members as co-authors should be submitted to an international journal before this date.

Data Date	**Designação da milestone** Milestone denomination
18-12-2014	database release

Descrição
Description

The database of all data collected in the field experiment would be available.

3.2.4.c Cronograma
3.2.4.c Timeline

Ficheiro com a designação "timeline.pdf", no 9. Ficheiros Anexos, desta Visão Global (caso exista).
File with the name "timeline.pdf" at 9. Attachments (if exists).

3.3. Referências Bibliográficas
3.3. Bibliographic References

Referência Reference	Ano Year	Publicação Publication
Rosado et al.	2012	Rosado, J., Manuela Morais, António Serafim, Ana Pedro, Helena Silva, Miguel Potes, David Brito, Rui Salgado, Ramiro Neves, Ana Lillebø, António Chambel, Vanda Pires, Carlos Pinto Gomes, Paulo Pinto (2012): Key long term patterns for the management and Conservation of temporary Mediterranean streams: a case study of the Pardiela river, southern Portugal (Guadiana catchment) . River Conservation and Management Eds: Philip J Boon and Paul J Raven. ISBN-13: 978-0-470-68208-1 - John Wiley & Sons,
Potes et al.	2012	**Potes, M., Costa, M. J., and Salgado, R., 2012: Satellite remote sensing of water turbidity in Alqueva reservoir and implications on lake modelling, Hydrol. Earth Syst. Sci., 16, 1623-1633, doi:10.5194/hess-16-1623-2012.**
Salgado and LeMoigne	2010	**Salgado, R. and P. Le Moigne (2010):Coupling of the FLake model to the Surfex externalized surface model.Boreal Env. Res. 15:231–244.**
Balsamo et al.	2012	**Balsamo, G., R. Salgado, E. Dutra, S. Boussetta, T. Stockdale, M. Potes, 2012: On the contribution of lakes in predicting near-surface temperature in a global weather forecasting model, Tellus-A, 64, 15829, DOI: 10.3402/tellusa.v64i0.15829**
Potes et al.	2013	**Potes, M., M.J. Costa, R. Salgado, D. Bortoli, A. Serafim and P. Le Moigne, 2013: Spectral measurements of underwater downwelling radiance of inland water bodies. Tellus A (in revision)**
Le Moigne et al.	2013	**Le Moigne, P., D. Legain, F. Lagarde, M.l Potes, D. Tzanos, E. Moulin, J. Barrié, R. Salgado, G. Messiaen, A. Fiandrino, S. Donier, O. Traullé, M.J. Costa, 2013: Evaluation of the lake model FLake over a coastal lagoon during the THAUMEX field campaign. Tellus A (in revision)**
Nordbo et al.	2011	Nordbo N, Launiainen S, Mammarella I, Lepparanta M, Huotari J, Ojanen A, Vesala T, 2011: Long-term energy flux measurements and energy balance over a small boreal lake using eddy covariance technique. J Geophys Res 116. doi:10.1029/2010JD014542
costa et al.	2006	Costa M. J., B. J. Sohn, V. Levizzani, and A. M. Silva, (2006), Radiative Forcing of Asian dusts determined from the synergized GOME and GMS satellite data - A case study. Journal of the Meteorological Society of Japan, 84, 85-95.
Nordbo et al.	2006	Nordbo N, Launiainen S, Mammarella I, Lepparanta M, Huotari J, Ojanen A, Vesala T,2011:Long-term energy flux measurements and energy balance over a small boreal lake using eddy covariance technique. J Geophys Res 116. doi:10.1029/2010JD014542
Novais et al.	2012	Novais M.H., Blanco S., Delgado C., Morais M., Hoffmann L. & L. Ector (2012). Ecological assessment of Portuguese reservoirs based on littoral epilithic diatoms. Hydrobiologia 695(1): 265-279. DOI 10.1007/s10750-012-1197-7
Masson et al.	2012	Masson, V., Le Moigne, P., Martin, E., Faroux, S., Alias, A., Alkama, R., Belamari, S., Barbu, A., Boone, A., Bouyssel, F., Brousseau, P., Brun, E., Calvet, J.-C., Carrer, D., Decharme, B., Delire, C., Donier, S., Essaouini, K., Gibelin, A.-L., Giordani, H., Habets, F., Jidane, M., Kerdraon, G., Kourzeneva, E., Lafaysse, M., Lafont, S., Lebeaupin Brossier, C., Lemonsu, A., Mahfouf, J.-F., Marguinaud, P., Mokhtari, M., Morin, S., Pigeon, G., Salgado, R., Seity, Y., Taillefer, F., Tanguy, G., Tulet, P., Vincendon, B., Vionnet, V., and Voldoire, A., 2012: The SURFEXv7.2 land and ocean surface platform for coupled or offline simulation of Earth surface variables and fluxes, Geosci. Model Dev. Discuss., 5, 3771-3851, doi:10.5194/gmdd-5-3771-2012.
Potes et al.	2012	Potes, M., Costa, M. J., and Salgado, R., 2012: Satellite remote sensing of water turbidity in Alqueva reservoir and implications on lake modelling, Hydrol. Earth Syst. Sci., 16, 1623-1633, doi:10.5194/hess-16-1623-2012, 2012
Balsamo et al.	2012	Balsamo, G., R. Salgado, E. Dutra, S. Boussetta, T. Stockdale, M. Potes, 2012: On the contribution of lakes in predicting near-surface temperature in a global weather forecasting model, Tellus-A, 64, 15829, DOI: 10.3402/tellusa.v64i0.15829, also available as ECMWF Tech. memo 648.
Antoine et al.	2013	Antoine, D., Morel, A., Leymarie, E., Houyou, A., Gentili, B., Victori, S., Buis, J.-P., Buis, N., Meunier, S., Canini, M., Crozel, D., Fougnie, B., and Henry, P. 2013. Underwater Radiance Distributions Measured with Miniaturized Multispectral Radiance Cameras. J. Atmos. Oceanic Technol. 30, 74–95.
Potes et al.	2011	Potes, M., Costa, M. J., Silva, J. C. B., Silva, A. M., and Morais, M.2011. Remote sensing of water quality parameters over Alqueva reservoir in the south of Portugal. Int. J. Remote Sens. 32:12, 3373-3388.
Mironov et al.	2010	Mironov, D. V., Heise, E., Kourzeneva, E., Ritter, B., Schneider, N. and Terzhevik, A. 2010. Implementation of the lake parameterisation scheme FLake into the numerical weather prediction model COSMO. Boreal Env. Res. 15, 218-230.
Salgado, R.	2006	Salgado R., Interacção solo – atmosfera em clima semi-árido. Tese de Doutoramento, Universidade de Évora, 285 pp.
Serafim et al.	2006	Serafim A., Morais M., Guilherme P., Sarmento P., Ruivo M. & Magriço A. (2006) Spatial and temporal heterogeneity in the Alqueva reservoir, Guadiana river, Portugal. Limnetica, 25 (3):771-786.
Morais et al.	2007	Morais M., Serafim A. M, Pintp P., Ilhéu A. & Ruivo M., 2007 - Monitoring of the water quality in Alqueva reservoir, Guadiana river, southern Portugal. Reservoir and River Basin management: Exchange of Experiences from Brazil, Portugal and Germany. Gunter Gunkel & Maria do Carmo Sobral (eds)Technical

		University of Berlim, Berlim: 96-112.
Lafore et al.	1998	Lafore, J.P et al, 1998: The Meso-NH Atmospheric simulation system. Part I: adiabatic formulation and control simulations. Ann. Geophysicae, 16, 90-109.

3.4. Publicações Anteriores
3.4. Past Publications

Referência Reference	Ano Year	Publicação Publication
Salgado & Le Moigne	2010	**Salgado, R., and Le Moigne, P.: Coupling of the FLake model to the Surfex externalized surface model, Boreal Env. Res. 15: 231–244.**
Costa et al.	2006	**Costa M. J., B. J. Sohn, V. Levizzani, and A. M. Silva, 2006: Radiative Forcing of Asian dust determined from the synergized GOME and GMS satellite data - A case study. Journal of the Meteorological Society of Japan, 84, 85-95**
Potes et al.	2012	**Potes, M., Costa, M. J., and Salgado, R., 2012: Satellite remote sensing of water turbidity in Alqueva reservoir and implications on lake modelling, Hydrol. Earth Syst. Sci., 16, 1623-1633, doi:10.5194/hess-16-1623-2012, 2012**
Novais et al.	2012	**Novais M.H., Blanco S., Delgado C., Morais M., Hoffmann L. & L. Ector (2012). Ecological assessment of Portuguese reservoirs based on littoral epilithic diatoms. Hydrobiologia 695(1): 265-279. DOI 10.1007/s10750-012-1197-7**
Balsamo et al.	2012	**Balsamo, G., R. Salgado, E. Dutra, S. Boussetta, T. Stockdale, M. Potes, 2012: , Tellus-A, 64, 15829, DOI: 10.340On the contribution of lakes in predicting near-surface temperature in a global weather forecasting model2/tellusa.v64i0.15829, also available as ECMWF Tech. memo 648.**

3.5. Ressubmissão de projectos
3.5. Project Resubmission

Ressubmissão?
Resubmission?

Não
No

4. Equipa de investigação
4. Research team

4.1 Lista de membros
4.1. Members list

Nome Name	Função Role	Grau Degree	%	CV nuclear Core CV	CV
Rui Salgado	Inv. Responsável	DOUTORAMENTO	70	✓	FCTSIG/cv
Ana Maria das Neves Conchinha Ramalho Ilhéu Janeiro	Investigador	MESTRADO	20	X	FCTSIG/cv
António Miguel Faustino Serafim	Investigador	LICENCIATURA	20	X	FCTSIG/cv
Novais M.H.	Investigador	DOUTORAMENTO	20	X	FCTSIG/cv
Maria Costa	Investigador	DOUTORAMENTO	15	✓	FCTSIG/cv
Maria Manuela Queiroz Martins Mantero Morais	Investigador	DOUTORAMENTO	15	✓	FCTSIG/cv
Miguel Potes	Investigador	MESTRADO	50	X	FCTSIG/cv
Paulo Canhoto	Investigador	DOUTORAMENTO	20	X	FCTSIG/cv

(O curriculum vitae de cada membro da equipa está disponível clicando no nome correspondente)
(Curriculum vitae for each research team member is available by clicking on the corresponding name)
Total: 8

4.2. Lista de membros a contratar durante a execução do projeto
4.2. Members list to hire during project's execution

Membro da equipa Team member	Função Role	Duração Duration	%tempo %time
(BPD) Bolseiro de Pós-Doutoramento 1	Bolseiro	12	100

Total: 1

5. Outros projetos
5. Other projects

5.1. Projetos financiados

5.1. Funded projects

(Vazio)
(Void)

5.2. Candidaturas similares
5.2. Similar applications

(Vazio)
(Void)

6. Indicadores previstos
6. Expected indicators

–

Indicadores de realização previstos para o projeto
Expected output indicators

Descrição Description	2014	2015	2016	2017	2018	Total
A - Publicações Publications						
Livros Books	0	0	0	0	0	**0**
Artigos em revistas internacionais Papers in international journals	4	0	0	0	0	**4**
Artigos em revistas nacionais Papers in national journals	0	0	0	0	0	**0**
B - Comunicações Communications						
Comunicações em encontros científicos internacionais Communications in international meetings	6	0	0	0	0	**6**
Comunicações em encontros científicos nacionais Communications in national meetings	3	0	0	0	0	**3**
C - Relatórios Reports	1	0	0	0	0	**1**
D - Organização de seminários e conferências Organization of seminars and conferences	1	0	0	0	0	**1**
E - Formação avançada Advanced training						
Teses de Doutoramento PhD theses	0	0	0	0	0	**0**
Teses de Mestrado Master theses	0	0	0	0	0	**0**
Outras Others	0	0	0	0	0	**0**
F - Modelos Models	0	0	0	0	0	**0**
G - Aplicações computacionais Software	1	0	0	0	0	**1**
H - Instalações piloto Pilot plants	0	0	0	0	0	**0**
I - Protótipos laboratoriais Prototypes	1	0	0	0	0	**1**
J - Patentes Patents	0	0	0	0	0	**0**
L - Outros Other						
	0	0	0	0	0	**0**
	0	0	0	0	0	**0**
	0	0	0	0	0	**0**

Acções de divulgação da actividade científica
Scientific activity spreading actions

We will organize the fourth workshop on "Parameterization of Lakes in Numerical Weather Prediction and Climate Modelling" in Évora on September 2014.
The aim of the workshop is to discuss and develop the methods of handling lakes in the numerical weather prediction (NWP) and climate models. Attention is paid to the prognostic parametrisations, assimilation of lake observations, description of lake physiographic properties in the models. The

Helsinki workshop continues the work started in the previous workshops in Zelenogorsk, 2008, results published in a special issue (No 2, Vol. 15) of Boreal Environment Research and Norrköping, 2010, material to be published in special lake issue of Tellus A in 2012.

7. Orçamento
7. Budget

Instituição Proponente
Principal Contractor

Universidade de Évora

Descrição Description	**2014**	**2015**	**2016**	**2017**	**2018**	**Total**
Recursos Humanos Human resources	19.510,00	0,00	0,00	0,00	0,00	**19.510,00**
Missões Missions	4.000,00	0,00	0,00	0,00	0,00	**4.000,00**
Consultores Consultants	2.500,00	0,00	0,00	0,00	0,00	**2.500,00**
Aquisição de bens e serviços Service procurement and acquisitions	13.000,00	0,00	0,00	0,00	0,00	**13.000,00**
Registo de patentes Patent registration	0,00	0,00	0,00	0,00	0,00	**0,00**
Adaptação de edifícios e instalações Adaptation of buildings and facilities	0,00	0,00	0,00	0,00	0,00	**0,00**
Gastos gerais Overheads	8.302,00	0,00	0,00	0,00	0,00	**8.302,00**
TOTAL DESPESAS CORRENTES TOTAL CURRENT EXPENSES	**47.312,00**	**0,00**	**0,00**	**0,00**	**0,00**	**47.312,00**
Equipamento Equipment	2.500,00	0,00	0,00	0,00	0,00	**2.500,00**
Total	**49.812,00**	**0,00**	**0,00**	**0,00**	**0,00**	**49.812,00**

Instituições Participantes
Participating Institutions

Empresa de Desenvolvimento e Infra-estruturas do Alqueva, SA

Descrição Description	**2014**	**2015**	**2016**	**2017**	**2018**	**Total**
Recursos Humanos Human resources	0,00	0,00	0,00	0,00	0,00	**0,00**
Missões Missions	0,00	0,00	0,00	0,00	0,00	**0,00**
Consultores Consultants	0,00	0,00	0,00	0,00	0,00	**0,00**
Aquisição de bens e serviços Service procurement and acquisitions	0,00	0,00	0,00	0,00	0,00	**0,00**
Registo de patentes Patent registration	0,00	0,00	0,00	0,00	0,00	**0,00**
Adaptação de edifícios e instalações Adaptation of buildings and facilities	0,00	0,00	0,00	0,00	0,00	**0,00**
Gastos gerais Overheads	0,00	0,00	0,00	0,00	0,00	**0,00**
TOTAL DESPESAS CORRENTES TOTAL CURRENT EXPENSES	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Equipamento Equipment	0,00	0,00	0,00	0,00	0,00	**0,00**
Total	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**

Orçamento Global
Global budget

Descrição Description	**2014**	**2015**	**2016**	**2017**	**2018**	**Total**
Recursos Humanos Human resources	19.510,00	0,00	0,00	0,00	0,00	**19.510,00**
Missões Missions	4.000,00	0,00	0,00	0,00	0,00	**4.000,00**
Consultores Consultants	2.500,00	0,00	0,00	0,00	0,00	**2.500,00**
Aquisição de bens e serviços Service procurement and acquisitions	13.000,00	0,00	0,00	0,00	0,00	**13.000,00**
Registo de patentes Patent registration	0,00	0,00	0,00	0,00	0,00	**0,00**
Adaptação de edifícios e instalações Adaptation of buildings and facilities	0,00	0,00	0,00	0,00	0,00	**0,00**
Gastos gerais Overheads	8.302,00	0,00	0,00	0,00	0,00	**8.302,00**
TOTAL DESPESAS CORRENTES TOTAL CURRENT EXPENSES	**47.312,00**	**0,00**	**0,00**	**0,00**	**0,00**	47.312,00
Equipamento Equipment	2.500,00	0,00	0,00	0,00	0,00	**2.500,00**
Total	**49.812,00**	**0,00**	**0,00**	**0,00**	**0,00**	49.812,00

Plano de financiamento
Finance plan

Descrição Description	**2014**	**2015**	**2016**	**2017**	**2018**	**Total**
Financiamento solicitado à FCT Requested funding	49.812,00	0,00	0,00	0,00	0,00	**49.812,00**
Financiamento próprio Own funding	0,00	0,00	0,00	0,00	0,00	**0,00**
Outro financiamento público Other public-sector funding	0,00	0,00	0,00	0,00	0,00	**0,00**
Outro financiamento privado Other private funding	0,00	0,00	0,00	0,00	0,00	**0,00**
Total do Projecto Total of the project	**49.812,00**	**0,00**	**0,00**	**0,00**	**0,00**	49.812,00

8. Justificação do orçamento
8. Budget rationale

–

8.1. Justificação dos recursos humanos
8.1. Human resources rationale

Tipo Type		**Nº de pessoas** No. of persons
(BPD) Bolsa de Pós-Doutoramento		1
Duração (em meses) Duration (in months)	**Custo envolvido (€)** ***(calculado)*** Total cost (€) *(estimated)*	**Outros custos (€)** Other costs (€)
12	17.940,00	1.570,00

Justificação do financiamento solicitado
Rationale for requested funding

This grant is requested to collaborate in all Tasks. The grant holder will participate in the planning of the experiment, assist the installation of the equipment and will follow the experimental phase, during which he will be involved in the quality control of the data. He /She will also collaborate in the design and working-out of the database.

8.2. Justificação de missões
8.2. Missions rationale

Tipo Type	**Nº de deslocações** No. of participations
Trabalho de campo	20

Local
Venue
Albufeira de Alqueva

Custo envolvido (€)
Cost (€)
4.000,00

Justificação do financiamento solicitado
Rationale for requested funding

Displacements to the Alqueva Reservoir for installation, maintenance and operate the equipment during the field experiment. The costs include also the transportation and use of a boat.

8.3. Justificação de consultores
8.3. Consultants rationale

Nome completo
Full name
Patrick Le Moigne

Instituição
Institution
Météo-France, CNRM-GAME/GMME, URA 1357, Toulouse, France

Fase do projeto
Project phase
Intensive period of ALEX 2014

Custo (€)
Cost (€)
2.500,00

Justificação do financiamento solicitado
Rationale for requested funding

Patrick Le Moigne is currently the responsible for the maintenance and the development of the SURFEX system, wich provides the surface schemes to all Meteo France NWP models.He has experience in organizing meteorological field campaigns, having been the organizer of the THAUMEX 2011 Experiment in Thau, France.
The consultant will come to Evora and Alqueva, to participate and give support to the intensive period of ALEX 2014 Experiment.
Patrick's visit will also contribute to increase the existing scientific collaboration between him and several team members and between the CGE and the CNRM.

Página na Internet onde pode ser consultado o CV do consultor
Web page where the consultant's CV can be accessed
http://home.uevora.pt/~rsal/EXPL_GEO_MET_1422_2013

8.4. Justificação de aquisição de bens e serviços
8.4. Service procurement and acquisitions

Tipo
Type
Analytical work at laboratories

Custo (€)
Cost (€)
4.000,00

Justificação do financiamento solicitado
Rationale for requested funding

Field surveys require devices for water and primary producers sampling, preservation and transportation to the laboratory. In laboratories, there will be need of considerable quantities of analytical effects, including reagents, glass material and other perishable material.

Tipo
Type
radiosondes

Custo (€)
Cost (€)
6.000,00

Justificação do financiamento solicitado
Rationale for requested funding

The launching of radiosondes will be an important task of the ALEX IOP.It is expected to launch about 16 balloons in 2 or 3 days.
The project will subcontract this service, possibly at the Portuguese Institute of the Ocean and the Atmosphere (IPMA).

Tipo
Type
IT Consumables

Custo (€)
Cost (€)
1.000,00

Justificação do financiamento solicitado
Rationale for requested funding

IT Consumables requested for the whole project, including cards and pen devices to storage data and ink cartridges.

Tipo
Type
Equipment maintenance

Custo (€)
Cost (€)
2.000,00

Justificação do financiamento solicitado
Rationale for requested funding

Maintenance and calibration of field equipment; Calibration of laboratory equipment

8.6. Justificação do Equipamento

8.6. Equipment rationale

8.6.1. Equipamento já disponível para a execução do projecto

8.6.1 Available equipment

Tipo de equipamento Equipment type	Fabricante Manufacturer	Modelo Model	Ano Year
Integrated Open-Path CO2 /H2O Gas Analyzer and 3D Sonic Anemometer	Campbell	IRGASON	2013
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
portable spectroradiometer	ASD	FieldSpecHH VNIR	2009
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Turbidity meter	Merck	Turbiquant 1500T	2009
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Oximeter	WTW	Oxi340i/set	1996
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
pH meter	WTW	ph540i/set	2003
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
pyrheliometers + Sun Tracker	Kipp & Zonen	SOLYS 2	2013
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
humidity and temperature profiler	RPG Radiometer Physics GmbH	RPG-HATPRO	2013
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Data Logger	Campbell Scientific	modelo CR3000	2013
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
meteorologica stations (4) with datalogger and sensors for temperature, moisture, solar and thermal radiation, precipitation, wind.	Campbell	several	1997
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Water temperature sensors (several)	Campbell	termistor 107	2013
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Weather Transmitter for barometric pressure, humidity, precipitation, temperature, and wind speed and direction measurements	Vaisala	WXT520	2013
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Raman Lidar System	Raman	PollyXT	2009
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Sun-sky photometer	CIMEL electronique	CE-318-2	2003
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Shadowband radiometer	YES	MFR-7	2002
Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Hemispheric spectral Nephelometer	TSI	3563	2002
Tipo de equipamento	**Fabricante**	**Modelo**	**Ano**

Equipment type	Manufacturer	Model	Year
Ceilometer	VAISALA	CL31	2006

Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Optic Microscope 40x	Leica	DMLB	2000

Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
Microscope	Nikon	LabPhot-2	1993

Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Ano** Year
multiparameter probe	In Situ	Troll 9500, profiler XP	2010

8.6.2. Discriminação do equipamento a adquirir

8.6.2. New equipment requested

Tipo de equipamento Equipment type	**Fabricante** Manufacturer	**Modelo** Model	**Custo (€)** Cost (€)
Underwater cosine receptor e adaptadores	ASD	FS Underwater cosine receptor	2.500,00

Justificação do financiamento solicitado

Rationale for requested funding

FieldSpecHH package for underwater radiance or irradiance measurements, including adaptor and foreoptics, in order to make the necessary measurements of underwater radiance, irradiance profiles.

8.7. Justificação de registo de patentes

8.7. Patent registration

(Vazio)
(Void)

8.8. Justificação de adaptação de edifícios e instalações

8.8. Adaptation of buildings and facilities

(Vazio)
(Void)

9. Ficheiros Anexos

9. Attachments

Nome Name	Tamanho Size
timeline.pdf	30Kb

10. Possíveis conflitos de interesse

10. Possible Conflicts of Interest

Lista
List

10-07-2013 10:44:32

Financiado por fundos estruturais da UE e fundos nacionais do MEC