



Data Management Plan for the UK SOLAS directed programme

including data management policy, metadata protocols
and project-specific data management plans

First edition: June 2006

1. Introduction

NERC requires all Directed Programmes to plan and implement a data management scheme. The planning must cover the practical arrangements while the programme is running and the subsequent maintenance and long-term curation of the data sets. The latter is increasingly important in view of the Environmental Information Regulations, which place a duty on Government funded bodies to make all publicly funded data readily and easily available.

The NERC Data Policy requires that all data are lodged with the appropriate NERC Designated Data Centre. In the context of the UK SOLAS programme these are the British Oceanographic Data Centre (BODC) and the British Atmospheric Data Centre (BADC), the respective Designated Data Centres for marine and atmospheric sciences. The minimum required standards of stewardship are summarised in Section 3.

NERC provides funding to the Data Centres for basic infrastructure support and the long-term maintenance and curation of NERC's data assets. Directed Programme budgets include the funds necessary for within-programme data management during their lifetimes.

An integral part of the Data Plan is an obligation upon UK SOLAS Principal Investigators (PIs) to ensure that data management is undertaken in a suitable way, and that adequate consideration is given to the 'data side' of their work. The programme's data management policy (specifying required actions) is outlined in [Annex 1](#). Individual project 'data management plans' (summarised in [Annex 3](#)) cover staff responsibilities, data collection policies, data standards, resourcing of data management, data quality and quality assurance.

This plan has been formulated following a review of the specified resource requirements and outputs set out in the project proposals and discussions between BODC/BADC, the UK SOLAS Science Coordinator (Dr Phil Williamson) and several project PIs in order to assess the scale of data collection/production. These include observational and modelling products, biological, chemical and geophysical samples, and the requirements to enable links to third party data sets.

2. The role of the UK SOLAS Data Centre (SDC)

Submission of and access to data will be through a common 'portal' and for the purposes of the UK SOLAS directed programme, the term UK SOLAS Data Centre (SDC) will refer to BADC and BODC. Data management costs have been allocated in the UK SOLAS budget for SDC services. Note that the SDC does not have data management responsibilities for non-programmatic science contributions to national SOLAS activities, i.e. SOLAS-relevant projects and activities supported by other funding mechanisms (NERC and non-NERC).

Given the complex and broad range of data encompassed by the UK SOLAS programme the nature of the data management will vary between projects. The basis of this has been agreed with PIs following an initial dialogue with the SDC and UK SOLAS Science Coordinator (see [Annex 3](#)).

The SDC will be the focal point for PIs regarding data issues. The SDC website will contain inventories providing comprehensive up to date information about the status of all project data sets and model runs, so that all UK SOLAS participants can easily request available data. The SDC will service data requests by UK SOLAS participants.

Following the completion of UK SOLAS, the SDC will ensure that data are passed to the appropriate International Data Centres (through international SOLAS and other bodies), ensuring that NERC meets its international obligations.

3. Minimum standards of stewardship for NERC data

To comply with the NERC Data Policy (www.nerc.ac.uk/data/policy.shtml) the following minimum standards are expected to apply when (digital) datasets form part of NERC's enduring data resource:

- i. The ownership and Intellectual Property Rights to the data set must be established, and NERC's policy towards exploiting and making it available to third parties agreed

- ii. The data set must be catalogued to the level of detail required by a NERC Designated Data Centre, so that it can be mentioned in web-based NERC data catalogues
- iii. Formal responsibility for the custody of the data set must be agreed
- iv. The data must be fully "worked up" (i.e. calibrated, quality-controlled etc.) with sufficient associated documentation to be of use to third parties without reference to the original collector
- v. The technical details of how the data are to be stored, managed and accessed must be agreed and suitably documented
- vi. The technological implications must be established (digital data stewardship implies the need for an underlying infrastructure of IT equipment and support)
- vii. The resources needed to carry out these intentions over the planned life of the data, in terms of staff (whether in project teams or the Data Centre) and IT equipment/infrastructure must be estimated and sources identified
- viii. A review mechanism must exist to reconsider periodically the costs and benefits of continuing to maintain the data. The intention to destroy or put at risk data should be publicised in advance, allowing time for response by interested parties.

The above requirements will be looked after 'automatically' for the UK SOLAS data sets managed by BODC and BADC. Nevertheless, PIs need to be aware of this framework.

4. Data and sample acquisition

UK SOLAS data cover a broad subject area, including oceanographic and atmospheric information, and the generation of model output. It is not the intention of this document to specify in detail how these data be collected, described and delivered to the data centres. However, a number of generic principles need to be adhered to.

Processed and project-specific data must be provided to the SDC by the Principal Investigator, field campaign leaders (research cruises and research flights) and project teams as they become available, not in the concluding few months or weeks of projects. However, great importance is given, both by the programme and by the SDC, to protecting the interests of data originators, and restrictions on the wider availability of the SDC-held data sets will therefore apply (see Data Policy at Annex 1).

A well structured and user-friendly identification system is essential for cruise-based data collection and sample labelling. Such arrangements are traditionally the responsibility of the cruise Principal Scientist. However, in order to assist the PIs and SDC, a representative of the SDC should be invited to attend pre-cruise planning meetings.

Station identifiers, navigational information and "basic" oceanographic data (for which the SDC will have quality-control responsibilities) must be provided to the SDC by the Principal Scientist immediately after a cruise. Normal practice, as for other Directed Programmes, will be for the SDC to meet the ship when it docks in the UK and to take delivery of this material together with a copy of the logs, calibration data and sensor information. If a cruise terminates in a foreign port it will be necessary for the PI and a representative of the SDC to meet immediately on return of the PI to the UK. A copy of the Cruise Summary Report (ROSCOP form) should be provided to the SDC by the Principal Scientist within one working week of the end of the cruise. A copy of the full cruise report should also be sent to the SDC, electronically, as soon as it is completed. The SDC will then assist in making this more widely available (e.g. via a link from the main programme website).

For projects collecting biological, chemical or geophysical samples it is the PI's responsibility to ensure that appropriate sample management measures are in place. However, it is important that the necessary collection details are provided to the SDC to form part of the overall project information.

For model data, information accompanying submitted data should include the model name and version number and a brief description of the model's general aim. Broad principles relating to model metadata are given in Section 5, and discussed further in [Annex 2](#). Detailed arrangements for submission and serving will be agreed with individual PIs.

5. Metadata

Metadata are a crucial part of any data archive since they ensure that the data can be understood at a later date. To guarantee the UK SOLAS data archive quality, full documentation on all validated raw and processed data, as well as on models and model results, must be provided to the SDC. It is therefore essential that metadata are submitted at the same time as the data sets to which they pertain. The responsibility for producing the metadata will lie with project PIs and the SDC. A metadata protocol is outlined at [Annex 2](#).

In addition to the standard metadata, investigators are encouraged to archive at the SDC all relevant information electronically, including references, papers, reports, etc., unless agreed otherwise between the PIs and the SDC.

6. Data formats and data media

Digital data should be collected and stored using standard, widely available software products and their related data formats. Whilst the SDC has experience in handling a very wide range of software, formats and media, Investigators should discuss with them at an early stage the proposed use of any data-handling or storage protocols that might be regarded as "non-standard".

In general, model data should be formatted in CF-compliant NetCDF files, although there will be exceptions (particularly PP and HDF will also be accepted). Documentation on formats and conventions is available from the SDC (www.badc.nerc.ac.uk/help/formats/index.html), which also provides links to downloadable free software packages to support NetCDF access.

Submission of data will generally be via CD-ROM, as a Word/Excel e-mail attachment or by FTP. In some instances (e.g. some of the atmospheric model output) an automatic web-based file uploader will be available. At an early stage PIs should discuss the options with the SDC.

CD-ROMs and or DVDs are currently the preferred means for making integrated data products from directed programmes available to the wider research community. However, there may be a preference towards a web-based final data product as UK SOLAS progresses. The UK SOLAS Steering Committee will review and decide on this at a later stage in the programme.

7. Data back-up policy

The consequences of losing data, due to insufficient or inappropriate provision for their back-up, are potentially catastrophic in the case of large data collections, and cumulatively serious in the case of smaller data sets. Rigid daily back-up programmes operated at the SDC safeguard major digital databases. Provision and support of back-up strategies for digital data stored locally are the responsibility of individual PIs or their delegates. Project PIs and Co-Is are responsible for providing appropriate back-up strategies for digital data stored locally or via other organisations.

As far as possible, analogue data (such as photographs) should be "disaster proofed" by transferring them into digital form, e.g. by scanning. Such duplication is not a waste of effort, even though the original, analogue version may have a longer lifetime than the format/media used for the digital transcription. Such data may then be included on a programme CD-ROM or DVD. Note that BODC has considerable experience in managing and publishing image data.

PIs should bear in mind that the timely deposit of data with the SDC will provide additional security for the project data.

8. Protection of data originator's Intellectual Property Rights (IPR)

The Steering Group and the SDC recognise the need to ensure reasonable protection of project scientist IPR. The UK SOLAS Data Policy ([Annex 1](#), below) addresses this and is intended to provide an appropriate balance between the protection of data originators' IPR and the potential benefits that may arise via data use by the programme, the wider research community and other interested parties.

ANNEX I UK SOLAS Data Management Policy

Data management arrangements for the UK SOLAS directed programme are expected to:

- Encourage UK SOLAS dissemination of scientific results
- Protect the rights of the individual scientists
- Treat all the involved researchers equitably
- Ensure the quality of the data in the UK SOLAS data archive.

However, these aims can conflict at times, and it is intended that the programme's Data Management Policy and associated protocols resolve these conflicts fairly. It is recognised that this cannot always be achieved to everyone's complete satisfaction; there are inevitably cases where individual interests clash with those of the UK SOLAS programme. Therefore to try to meet these aims, all PIs involved in UK SOLAS, in accordance with and on behalf of their Co-Investigators, have agreed to abide by the following conditions as part of the acceptance of the grant award:

Data management

Data collected within the UK SOLAS programme will comply with NERC's policy on data management (www.nerc.ac.uk/data/policy.shtml). The main objective of this policy is to ensure that the data will contribute to a key NERC resource, which will continue to be exploited both scientifically and commercially long after the formal end of the programme. The management of the data collected within the UK SOLAS programme will be the responsibility of the relevant NERC Designated Data Centres (e.g. BADC, BODC), and funds have been made available from the SOLAS budget to support this activity.

UK SOLAS data policy

The following data policy framework applies to UK SOLAS, in line with other NERC thematic/directed programmes. Subject to Steering Committee overview and any special considerations that may apply to Observatory-based datasets (main issues outlined below), it will apply to all research grants, studentships and contracts funded through UK SOLAS:

- a) Data¹ should be lodged with the appropriate Data Centre on acquisition², together with such metadata as are defined under the UK SOLAS data management plan.
- b) Data will be embargoed for 1 year from acquisition, allowing the PI and co-workers to exploit them in the first instance. The metadata will not be embargoed, to allow the wider community to be aware of work being carried out under UK SOLAS and facilitate community building.
- c) With the exception of studentship-related data (see below), data will be made available by the SOLAS Data Centre to the UK SOLAS community after 1 year, and to everyone after 2 years.
- d) In the case of PhD students supported by UK SOLAS, data central to the student's study will not be released by the SOLAS Data Centre for the duration of the studentship without prior agreement between the Data Centre, the UK SOLAS Science Coordinator and the student's supervisor. On cessation of the studentship funding all three parties will consult before allowing wider access to the data relating to the studentship. This is intended to protect a student's intellectual property, but does not imply that he/she has exclusive rights to UK SOLAS data.

¹ **Data:** include present-day observations, model output, data syntheses, data-model syntheses, model codes and information on actual samples.

² **On acquisition:** the time-scale may vary between data types (for example, real-time data could go directly to a data centre) but the overall aim is to keep the time-scale as short as possible and certainly less than 6 months. This is to ensure that data acquired during UK SOLAS are available to the UK SOLAS community within the lifetime of the programme.

- e) Anyone making further scientific use of UK SOLAS data within 3 years of them being lodged at the Data Centre will be required to include the PI and/or co-workers (as appropriate) as co-author/s on any resulting papers, if the PI and/or co-workers so desire.
- f) Any corrections, improvements or amendments to data must be lodged with the appropriate data centre as soon as possible.
- g) PIs making use of UK SOLAS data are responsible for ensuring that the data used in publications are the best available at the time.
- h) Data submitted to the Data Centre must be in the data format agreed between the Data Centre and PI. In addition, all agreed metadata must be supplied to the Data Centre.
- i) During the time when data are restricted from the public domain, no data will be transferred to parties outside the programme without the explicit agreement of the originator. In addition, guidance will need to be sought from the Science Coordinator and the Steering Committee if major data transfers are involved, to avoid compromising the interests of other programme participants.
- j) In the event of dispute, the final decision rests with the UK SOLAS Science Coordinator and the Steering Committee.
- k) PIs and/or co-workers failing to comply with the UK SOLAS data policy would be subject to appropriate sanctions.

For datasets arising from the UK SOLAS Observatory on Cape Verde³, special considerations will apply. Current arrangements [June 2006] are as follows:

- For observations and short-term experiments requiring limited post processing, DIAC data will be delivered to BADC within 30 days of collection, with unvalidated data potentially available to the UK SOLAS research community in real-time or on a daily basis, dependent on data bandwidth connections on site.
- Final data from instrumentation requiring extensive post processing, such as GC instruments, will be available 3 months after raw data collection.
- Final validated data will be lodged for archiving at BADC in NASA AMES format.

Arrangements for Observatory datasets involving international collaborators, and the timescale for public dissemination (via a dedicated web site) are issues that are still under discussion. A review of Observatory data management arrangements is expected in late 2006, after atmospheric measurements and data transfer protocols are routinely in operation.

³ www.york.ac.uk/capeverde/ ; main support via a contract to DIAC

ANNEX 2

UK SOLAS Metadata Protocol

1. Introduction

The term *metadata* encompasses all the information necessary to interpret, understand and use a given dataset. *Keyword metadata* more particularly apply to information (keywords) that can be used to identify and locate the data that meet the user's requirements (via a Web browser, a Web based catalogue, etc). *Detailed metadata* include the additional information necessary for a user to work with the data without reference back to the data provider. The metadata required by the UK SOLAS programme include both keyword and detailed metadata.

Metadata pertaining to observational data, for example, include details about **how** (with which instrument or technique), **when** and **where** the data have been collected, by **whom** (including affiliation and contact email, address or telephone number) and in the framework of which research project.

In the case of all submitted data, the SDC needs to know how the values were arrived at. The derivation process must be stated: all processing and calibration steps should be described and calibration values supplied. The nature and units of the recorded variables are essential, as well as the grid or the reference system. The SDC requests that as much information as possible about fieldwork instrumentation be included, e.g. serial number, copies of manufacturer's calibration sheets, and recent calibrations, if applicable.

Metadata pertaining to model output should include the name of the model, the conditions of the calculation, the nature of its output, the geographical domain over which the output is defined (when applicable). Specific conditions applying to the model or the experiment may be mentioned. Metadata also include information on the format in which the data are stored, and the order of the variables, to allow potential users to read them. Metadata pertaining to software models include the key points of the theory on which the model is based, the techniques and computational language used, and references.

The following lists the minimum metadata required to accompany data files submitted to the UK SOLAS Data Centre (SDC). Since there is a large range of data types within UK SOLAS, the SDC will liaise with project workers submitting data on a case-by-case basis to ensure that metadata formats are appropriate and to gain additional relevant information as necessary.

2. Metadata for UK SOLAS projects

2.1 Metadata for tables of numbers (observations or model output)

2.1.1 Content

Metadata include the following overall information. Some information in this list may be applicable in specific cases only.

- **Information about the experiment**
 - Date when fieldwork, experiment or model simulation started
 - Site or trajectory bounding box or domain limits
 - Platform (e.g. ship, cruise number), instrumentation (instrument make, model and serial number)
 - Model name.
- **Information about the experimenter(s)**
 - Names, affiliation, contact address, e-mail, telephone number
 - Programme name, research project number.
- **Information about the independent variables (spatio-temporal grid)**
 - Names, units, domain of definition of independent variables
 - Interval values when appropriate.
- **Information about the data, including processing level**
 - Version number

- Date of last revision
- Processing level (nature of raw data, derivation method: processing steps, calibrations applied).
- Nature, name, units, scaling factors of dependent variables.
- **Information about data storage**
 - Number of files of the entire dataset
 - File number of current file.
- **Information about data format**
 - Type of format e.g. ASCII, Excel, Matlab, NetCDF.
- **Additional information**
 - May include particular conditions of experiment or model run, model boundary conditions, article reference, and sources of further information.

2.1.2 *Metadata storage*

Ideally, each data file should include a header containing the metadata. If there is a large amount of information (e.g. description of many processing steps, calibration techniques), then a separate text file can be used as an alternative.

2.2 Metadata for software

2.2.1 *Content*

Metadata pertaining to a model should include the following:

- **Information on the model**
 - Brief description of model general aim
 - Model structure
 - Physical processes involved, including equation set
 - Algorithmic implementation techniques used
 - Spatio-temporal coverage when applying
 - Boundary conditions, including reference(s)
 - Initial conditions, including reference(s)
 - Program language
 - Input nature and format
 - Output nature and format
 - Summary of model validation, or appropriate reference(s)
 - Summary of results from former studies conducted with the model, or appropriate reference(s).
- **Information on the author(s)**
 - Names, affiliation, contact address, e-mail, telephone number.
 - Programme name, research project number.

2.2.2 *Metadata storage*

Metadata relative to software can be included as comments in the top section of the source file or can alternatively be provided as a separate text file.

2.2.3 *Format*

Text. There is no particular requirement regarding software metadata formatting.

3. Additional documentation

Any additional documentation on recorded data or images, whether pertaining to a single data file or a whole dataset, that would not find its place into the structures described above (because it does not fall into any described category or because it is too voluminous) may be submitted to the SDC in the form of a text file that will be stored in the UK SOLAS archive documentation directory.

These documents may for example include technique description, possible use of the data, study conclusions, etc.

ANNEX 3 Summary of work by UK SOLAS Data Centre for each project

[excluding data management for Cape Verde Observatory and CASE studentships]

Introduction

This document outlines the work by the UK SOLAS Data Centre (SDC) for each research grant funded to June 2006, listed alphabetically by PI. The contents are based on the proposals submitted to NERC and subsequent discussions with research groups. **Please note:** The ability of the SDC to meet the (approximate) milestones is entirely dependent on the cooperation of the individual participants. The preceding Data Management Plan sets out the relevant roles and responsibilities of the SDC and project participants.

NE/C001931/1 – Eric Achterberg

Project data summary

This project looks at the effect of atmospheric dust on the near-surface plankton community. Fieldwork will focus on the North Atlantic tropical ocean, based on open ocean cruises in 2006 (air-sea campaign with DODO) and in 2007 (process study). During both cruises, water and atmospheric sampling of rain and dust will be carried out daily. Continuous measurements and discrete water collections will be made at the surface and at depth using a CTD profiler and rosette sampler, trace metal bottle hydrocasts, a towed trace-metal clean sampling fish, and ship-borne meteorological, hydrographical and atmospheric samplers and sensors.

In addition to the core hydrographical and meteorological data, measurements will include chemical analyses of inorganic micro-nutrient using conventional and nanomolar techniques, dissolved and particulate trace metal and carbon analyses, dissolved nitrogen and organic phosphate, and biological measurements including surface and profiling FRRF measurements, phytoplankton pigments by HPLC, bacteria, picoplankton and larger phytoplankton abundance by AFC and reversed microscopy, primary production and nitrogen uptake measurements, bacterial production and molecular data.

Water samples will also be used for on-deck bioassay experiments looking at the influence of dust on phytoplankton and microbial communities. Associated data will include the range of chemical and biological measurements listed above. Aerosol and rain samples will be analysed for major nutrients and trace metal concentrations. Dust samples will also be preserved for post-fieldwork measurements of nutrients and trace metal concentration in controlled dust dissolution experiments set up in the laboratory.

In addition to the open ocean cruises, time-series fieldwork has also been planned for water and atmospheric sampling at the SOLAS Cape Verde Observatory over a period of up to 2 years.

SDC tasks

1) *Ship data (two cruises).*

- Attend cruise planning and post-cruise meetings.
- Acquire ROSCOP, cruise reports, sampling logs, and UKORS' ship data backup within 3 months of fieldwork ending.
- Build up cruise data inventory
- Acquire processed CTD and continuous underway data, water bottle sample analyses, and atmospheric data no more than six months after collection or analyses.
- Acquire data from on-board bioassay and dust dissolution experiments no more than 1 year after fieldwork ended.
- Reformat water bottle data files and load to database.
- Transfer CTD and underway data to BODC format, visually screen the data for spikes of non-oceanographic origin and apply flags, load CTD and underway data to database.
- Calibrate CTD and underway salinity, fluorescence and oxygen channels against available water sample measurements.
- Reformat atmospheric data and load to database.
- Reformat data from bioassay experiments and load to database.
- Create documentation about the instruments, analyses, processing, calibrations, quality control procedures and data quality.
- Advertise availability of data set.

2) *Cape Verde time-series data*

- Build up time series data inventory.

- Acquire fully processed and quality controlled water column and atmospheric time-series data no more than 10 months after the end of time-series sampling (currently set to June 2008).
- Transfer data to BODC/BADC format.
- Load to database.
- Create documentation about the instruments, analyses, processing, calibrations, quality control procedures and data quality.
- Advertise availability of dataset.

3) *Laboratory dust dissolution experiments data*

- Build up data inventory.
- Acquire dust dissolution experiment data (time series of nutrients and trace metals together with experimental metadata).
- Load experimental data and metadata to database linking data back to their fieldwork and sampling metadata, and associated measurements.
- Create documentation about the experimental set up, analyses and methodology.
- Advertise availability of dataset.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2005-06	Provide data management support for first cruise
2006-07	Build up data inventory for first cruise Bank data from first cruise Provide data management support for second cruise Build up data inventory for second cruise and Cape Verde time-series
2007-08	Bank data from second cruise
2008-09	Bank dust dissolution experiment data
2009-10	Bank Cape Verde time-series data

NE/E011454/1 – James Allan

Project data summary

This project seeks to characterise the chemical and physical properties of marine aerosol in the Cape Verde region, and thereby to clarify their roles in chemical cycling and in cloud formation. Fieldwork will take place on the RHaMBLe cruise (D319, May-June 2007), with the aim of collecting a comprehensive suite of aerosol property data, including particle size spectra, chemical composition and hygroscopicity. The data collected during fieldwork will be used in model simulations of cloud droplet formation, and to quantify the effects of particle size and composition on cloud condensation processes.

SDC Tasks

- Acquire aerosol data no more than 6 months after completion of analysis
- Reformat data and load to database
- Service requests for data from SOLAS participants
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Web pages describing the data available at the data centre

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Support to scientists on formats and metadata. Archival of aerosol data.
2008-09	Archival of model output.

	Archival of late data, update of documentation and web page, archive tidying. Release of 2007-08 data to SOLAS community.
2009-10	Release of 2007-08 data to public. Release of model output to SOLAS community.
2010-2011	Release of model output to public.

NE/E011314/1 – Icarus Allen

Project data summary

This project aims to establish the infrastructure for a 3-D model simulation of the chemistry of dimethylsulphoniopropionate (DMSP) and its product dimethyl sulphide (DMS) in the vicinity of Cape Verde and in the North East Atlantic. The model will utilise the data resulting from fieldwork undertaken by a number of UK SOLAS projects, such as DOGEE, INSPIRE and DODO.

SDC tasks

- Formatting support for use of standard formats.
- Acquire and bank model output
- Service requests for data from SOLAS participants
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Submission tools for web and ftp-based uploading.
- Web pages describing the data available at the data centre

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Support to scientists on formats and metadata.
2008-09	Archival of model output.
2009-10	Release of model output to SOLAS community.
2010-11	Release of model output to public.

NE/C51715X/1 – Steve Archer

Project data summary

This project will use laboratory experiments, annual sampling at the PML L4 time-series station between February 2006 and March 2007, participation to an oceanic cruise in early spring 2007 (UK SOLAS Achterberg 2007), and modelling studies to study the photoprotective role of dimethylsulphoniopropionate (DMSP) and quaternary ammonium compounds (QACs) in plankton organisms, investigate how this role influences their production rates in marine surface waters and affects the production of their volatile breakdown products dimethyl sulphide (DMS) and ammonia (NH₃).

Sampling at the L4 station will be on a bi-weekly frequency (down from weekly in original proposal) and from two depths. The set of measurements will have the following components: 1) discrete *in situ* particulate DMSP, dimethylsulphoxide (DMSO) and glycine betaine (GBT), dissolved DMSP and DMS, NH₄ (fluorometric method), chlorophyll *a*, POC, PON and POS, and xanthophylls and mycosporine-like amino-acids (MAAs) concentrations, 2) irradiance measurements using a Satlantic multi-spectral 400-865nm radiometer, and 3) ultraviolet radiation measurements using 4 wavelengths UV radiometer (305, 325, 340 and 380 nm), 4) photophysiological parameters (including quantification of photoinhibition) by *in situ* FRRF, 5) discrete photophysiological parameters measured by Satlantic FRe fluorometer and DMSP/GBT turnover/oxidation in photo-physiological incubation experiments of natural waters.

Discrete measurements will be provided merged to or alongside complementary data from PML L4 core measurements suite if available at time of submission. This includes: salinity, temperature, phytoplankton

counts, HPLC pigments, micro- and meso-zooplankton taxonomy and abundances, bacterial abundance, nutrients, and meteorology.

Sampling during the oceanic cruise will be high frequency 24h-sampling during *in situ* diel studies or/and on-deck incubation experiments with and without UV. The same set of measurements as for L4 will be made by scientists working on the project. All data from cruise and L4 time-series to be sent to BODC by September 2007 at latest.

SDC tasks

1) *Experimental data from laboratory experiment on phytoplankton cultures.*

No SDC involvement is envisaged here – PI will be responsible for the management of data arising from laboratory experiments.

2) *L4 time series data.*

- Build up data inventory.
- Acquire discrete water bottle measurements (alongside L4 time-series core hydrographical measurements).
- Acquire fully processed and QCed optical data from Satlantic multi-spectral radiometer, UV radiometer, and FRRF data (a copy of the primary raw data may be requested for backup in BODC's archives).
- Acquire fully processed and QCed FRe data.
- Acquire incubation data and experimental metadata.
- Reformat water bottle data file and load data to database.
- Transfer profiling optical sensor data (radiometers and FRRF) to BODC format, check visually and load to database.
- Reformat bioassay experiment data file(s) and load to database.
- Create documentation about the instruments, analyses, processing, calibrations, quality control procedures and data quality.
- Advertise availability of dataset.

3) *Cruise data.*

- Acquire discrete water bottle measurements.
- Acquire fully processed and QCed optical data from Satlantic multi-spectral radiometer, UV radiometer, and FRRF data (a copy of the primary raw data may be requested for backup in BODC's archives).
- Acquire fully processed and QCed FRe data
- Acquire incubation data and experimental metadata.
- Reformat water bottle data file and load data to database.
- Transfer profiling optical sensor data (radiometers and FRRF) to BODC format, check visually and load to database.
- Reformat bioassay experiment data file(s) and load to database.
- Create documentation about the instruments, analyses, processing, calibrations, quality control procedures and data quality.
- Advertise availability of dataset.

4) *Model data*

It is still uncertain whether model data will be included as part of the banked data set generated by this project. The handling of these data is not therefore included in this initial DM plan.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2006-07	Build up data inventory for L4 time-series station
2007-08	Build up data inventory for cruise participation Bank data from cruise Bank data from L4 time-series
2008-09	Complete data banking

NE/C001842/1 – Ian Brooks⁴ (SEASAW)

⁴ The original PI for this award, Mike Smith, is now Co-I

Project data summary

Data acquisition for this project is ship-based only. Data will be obtained during two open ocean cruises: the Upstill-Goddard's DOGEE 1 cruise in 2006 and a dedicated cruise in 2007. The project will study air-sea exchange rates and processes through a series of meteorological, atmospheric and sea surface measurements and observations using high resolution multi-sensor instrumentation such as NOC's AutoFlux and Leeds' MicroMet systems to record meteorological parameters and quantify heat and gas exchanges, sonic and ultrasonic anemometers for high resolution wind data, condensation and CLASP (Compact Lightweight Aerosol Spectrometer Probe) particle counters to measure marine aerosol and bubble size spectra, mass spectrometers (Aerosol Time-of-Flight Mass Spectrometers, ATOFMS) to determine individual airborne particle size and chemical composition, capacitance wave wires, and a number of ship-borne video cameras and video buoy deployments to record and quantify whitecap formation, wave breaking processes, bubble formation and other sea surface characteristics.

SDC tasks

For both cruises

- Attend cruise planning and post-cruise meetings.
- Acquire ROSCOP, cruise report, sampling logs, and UKORS' ship data backup within 3 months of fieldwork ending.
- Build up cruise data inventory.
- Acquire satellite images.
- Acquire ship's continuous underway data, transfer to BODC file format, screen, calibrate sensor values against water sampling as necessary, and bank in database.
- Acquire mean meteorological parameters data, gas concentrations and processed flux data from AutoFlux and MicroMet systems.
- Acquire 3 axis wind data, convert to BODC file format and bank in database.
- Acquire airflow distortion model output data.
- Acquire CLASPs, condensation particle counters and ATOFMS data.
- Acquire whitecap data and images.
- Acquire wave breaking data and images.
- Acquire sea-spray particle data and images.
- Catalogue video images and bank in database.
- Convert numerical data files to BODC file format and bank in database.
- Create documentation about the instruments, analyses, processing, calibrations, quality control procedures and data quality.
- Advertise availability of data sets.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Bank data from first cruise. Provide data management support for second cruise.
2008-09	Build up data inventory for second cruise. Bank data from second cruise.

NE/D006538/1 – Lucy Carpenter

Project data summary

This project includes a method development phase which aims at developing novel *in situ* techniques for measuring I₂ in air, and an experimental phase mainly based on controlled incubation of various species of common European seaweeds in the laboratory in order to investigate the following aspect of iodine biogeochemistry in the marine environment: i) the effect of ozone concentration, light level and oxidative stress on the fluxes of I₂ and particles (VIOCs) emission from seaweeds; ii) the effect of ozone concentration on the sea-air production rates of both I₂ and organoiodine compounds from natural seawater, iodide-containing artificial seawater and iodide-containing artificial seawater containing different DOM concentration; iii) characterisation of low-molecular-weight non-volatile DOI and other water soluble

organic material in surface seawater using LC/MS techniques; and iv) impact of photolysis of non-volatile DOI and VIOC on surface layer iodide concentration.

SDC tasks

No involvement from the SDC is currently envisaged for the data generated by this project. The PI will be responsible for the management of data and metadata arising from the laboratory experiments and coastal fieldwork.

Cape Verde Atmospheric Observatory - Lucy Carpenter

Project data summary

The project involves establishment of a monitoring site on the island of Sao Vicente, Cape Verde. The Observatory is a UK SOLAS collaboration with international SOLAS partners. Trace gas measurements will be made near Calhau on the island with instruments housed in a converted shipping container. The first measurements were scheduled for March 2006 with full operations from June 2006 and the current contract provides for two years although DIAC, NERC’s Distributed Institute for Atmospheric Composition will be interested in continuing these long-term measurements. It is also envisaged that short term extra instruments will be housed in the container/laboratory and space is available for this.

SDC tasks

- Liaise with York University for O₃, CO, non-methane hydrocarbons (NMHCs), dimethyl sulphide (DMS), oxygenated Volatile Organic Compounds (oVOCS), meteorological suite and radiosonde data.
- Liaise with Bristol on GC-MS (Gas Chromatography - Mass Spectrometry) halocarbon data.
- Liaise with Leeds of NO_x data.
- Collect data from other short term instrument deployments.
- Archival of data within 6 months of collection.
- Formatting support for use of standard formats likely to be NASA Ames particularly.
- Support for metadata collection to the level required by the Climate and Forecasting metadata standards.
- Service requests for data from SOLAS participants.
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Submission tools for web and ftp-based uploading.
- Web pages describing the data available at the data centre.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2006-07	Support to scientists on formats and metadata. Archival of first results from Cape Verde.
2007-08	Continued archival of data. Release of 2006-07 data to SOLAS community.
2008-09	Continued archival of data. Release of 2006-07 data to public. Release of 2007-08 data to SOLAS community.
2009-10	Continued archival of data. Release of 2007-08 data to public. Release of 2008-09 data to SOLAS community.
2010-11	Archival of any further data, update of documentation and web page, archive tidying. Release of 2008-09 data to public.

Project data summary

The project uses modelling to study the effects of aerosol in the marine atmospheric boundary layer. Firstly the level of understanding of aerosols in this area will be assessed by comparing modelled and observed datasets. The model to be used is the Global Model of Aerosol Processes (GLOMAP), hosted in the TOMCAT transport model. Modelling improvements will be made and final outputs will be 3D gridded fields of trace gases, aerosol size distributions and composition. A comparison between this fine scale detailed modelling and the necessarily less detailed aerosol scheme in the UK Unified Model will be made for testing and improvement of the UM. A final aspect will be GLOMAP runs in support of other SOLAS projects that involve field campaigns so that they can be used in planning of these campaigns as well as in subsequent data analysis. The results from these other campaigns will also feedback to aid model development.

SDC tasks

1) *Source observations for model assessment and development*

- Observed global aerosol properties datasets both in and above the atmospheric boundary layer. Relevant properties are observed distributions of condensation nuclei and size-resolved aerosol composition data.
- Archiving of some of these sourced data at SDC if needed.
- Results from other SOLAS campaigns to test the GLOMAP results for specific scenarios e.g. sea spray data.

2) *Unified Model support*

- Access to UM runs via SDC

3) *Final model output*

- Final evaluated model results from the GLOMAP model will be archived in accordance with the SDC criteria for saving model data.
- Assessment of the archival format such as NetCDF, PP or HDF and support for the subsequent conversion.
- Support for conformance to the Climate and Forecasting metadata standards ensuring metadata is collected such as model name, version, conditions of calculation, geographical domain, source code, initial and boundary conditions as well as estimates of the difficulty of recreating the simulation to aid in lifetime review of the dataset during future archive management.

4) *SOLAS Campaign support*

- Collect together the GLOMAP runs in support of other campaigns or link to the Leeds site at www.env.leeds.ac.uk/GLOMAT/ITOP

5) *General archive running*

- Service requests for data from SOLAS participants.
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Submission tools for web and ftp-based uploading to the SDC
- Web pages describing the source and model run data available at the SDC.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2006-07	Provide source data in support of model review Provide access to UM data
2007-08	Provide access to model runs to other SOLAS projects Support formatting of the model data
2008-09	Archive final outputs from GLOMAP model
2009-10	Tidy up archive Release of 2007/08 output to public
2010-11	Release of 2008/09 output to public

Project data summary

This project will look at the interactions between algae and bacteria and how they may influence the flux of DMS to the atmosphere. The study will use laboratory experiments on cultivated organisms such as a collection of bacterial isolates from phytoplankton cultures of DMS producing species alongside model development..

SDC tasks

No involvement from the SDC is currently envisaged for the data generated by this project. Model code or output could be archived at the SDC if requested.

NE/C517276/1 – Ellie HighwoodProject data summary

DODO (Dust Outflow & Deposition to the Ocean) is quantifying the chemical and microphysical properties of dust from the Sahara that is transported to the Atlantic Ocean. In situ measurements are being made using the Facility for Airborne Atmospheric Measurements (FAAM) aircraft and ship-based instrumentation.

Eight flights took place in February 06 in conjunction with the Dust and Biomass Experiment (DABEX) run by the Met Office. The aircraft used full radiation and aerosol microphysics instrument sets. Observations have also been taken on the UK-SOLAS cruise on RV Poseidon.

Three further flights will take place alongside the African Monsoon Multidisciplinary Analyses (AMMA) experiment in August 2006. At this time the aircraft will have chemistry and microphysics instrumentation. Also during AMMA, there will be aerosol sampling from the French ATR42 aircraft.

After the campaign element and from October 2006, DODO will involve dust transport model development using a regional version of the UK Unified Model. Outputs will be a climatology of dust transport and deposition as well as case studies.

SDC tasks

- Collect non-core data from the two aircraft campaigns. Core aircraft instrument data is automatically placed in the SDC as part of normal FAAM operations.
- Provide support to bring formatting and metadata standards equivalent to that of FAAM core data.
- Collect any successful ship-based hand-held optical depth measurements.
- Collect University of Birmingham's ship-based measurements of aerosol particles.
- Process cruise data to normal SDC standards for cruise data.
- Post-campaign analysis is taking place at Birmingham, Manchester, Leeds, York and Reading. Some of these groups have worked with the SDC before to formatting and metadata standards but some have not and will need SDC contact and support in this area.
- Make arrangements so that the data protocols for DABEX, AMMA and DODO work together, including the NASA element to AMMA.
- Service requests for data from SOLAS participants.
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Submission tools for web and ftp-based uploading to the SDC
- Provide access to model outputs from the GLOMAP SOLAS project NE/C001915/1 to compare with the model results of this project.
- Archive final model output climatology and case study data to accepted format and metadata standard.
- Archive dust transport source code module if agreed with the PI and collaborators at the end of the project.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2006-07	Make sure SOLAS, DABEX and AMMA data policies work together Collect non-core aircraft campaign data Archival of cruise data

2007-08	Collect results of analyses of campaign samples Formatting and metadata support to various universities
2008-09	Archive model output Release of 2006-07 data to public
2009-10	Archival of late data, update of documentation and web page, archive tidying Release of 2007-08 data to public

NE/E011470/1 – Michael Krom

Project data summary

Much of the iron in atmospheric dusts is in the form of biologically-unavailable Goethite and Haematite, direct products of desert-weathering. This project aims to clarify the conditions under which these refractory iron oxides in atmospheric dust are converted to more reactive forms, such as Fe oxyhydroxide nanoparticles. Field- and laboratory-work will characterise and quantify the abundance of Fe nanoparticles in atmospheric dust to assess the solubility of dust-borne Fe. Changes to the Fe content of dust due to transit through the guts of zooplankton will also be examined.

Atmospheric dust sampling will be carried out at the Cape Verde observatory and on two UK SOLAS cruises in the tropical Atlantic. Characterisations of dust samples will be compared with characterisations of Saharan soils known to be significant sources of dust. Water samples used to establish microcosm experiments will be collected from offshore stations south of Monaco.

SDC Tasks

- Acquire data no more than 6 months after completion of laboratory- or fieldwork, or analysis.
- Reformat data and load to database.
- Formatting support for use of standard formats for Cape Verde dust data.
- Support for metadata collection, for Cape Verde dust data, to the level required by the Climate and Forecasting metadata standards.
- Service requests for data from SOLAS participants.
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Submission tools for web and ftp-based uploading.
- Web pages describing the data available at the data centre.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Support to scientists on formats and metadata
2008-09	Archival of Cape Verde dust data Archival of cruise dust data Archival of microcosm experiment data
2009-10	Archival of late data, update of documentation and web page, archive tidying Release of 2008-09 data to SOLAS community
2010-11	Release of 2008-09 data to public

NE/E01111X/1 – Alastair Lewis

Project data summary

This project will examine the chemical structure of the lowermost atmosphere. Ship-based (D319) and coastal (Cape Verde) fieldwork will establish vertical distributions of fine particles and trace gases such as ozone, carbon monoxide, oxides of nitrogen and volatile organic compounds such as hydrocarbons,

halocarbons and oxygenated compounds (acetone, acetaldehyde and methanol). A designated aircraft campaign will overpass RV Discovery, during D319 in May/June 2007, to provide a geographical context for the vertical profiles.

SDC Tasks

1) *Ship data*

- Acquire ship-based data no more than 6 months after completion of fieldwork or analysis
- Reformat data and load to database
- Service requests for data from SOLAS participants
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Document datasets in online catalogues

2) *Aircraft and Cape Verde fieldwork data*

- Acquire data no more than 6 months after completion of fieldwork or analysis
- Formatting support for use of standard formats likely to be NASA Ames particularly.
- Support for metadata collection to the level required by the Climate and Forecasting metadata standards.
- Service requests for data from SOLAS participants.
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Submission tools for web and ftp-based uploading.
- Web pages describing the data available at the data centre.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Continue Cape Verde data Support to scientists on formats and metadata Archival of cruise data Archival of aircraft data
2008-09	Archival of late data, update of documentation and web page, archive tidying Release of 2007-08 data to SOLAS community
2009-10	Release of 2007-08 data to public

NE/D006511/1 - Gill Malin (INSPIRE)

Project data summary

This project combines fieldwork, laboratory experiments and modelling studies to investigate the dynamics of iodocarbons in near-surface waters. Field studies will take place in 2007 and 2008 in the Cape Verde region in order to link data acquired at sea with atmospheric data from the SOLAS observatory. Fieldwork in 2007 (with Eric Achterberg's cruise) will focus on acquiring measurements of iodocarbon concentrations and composition for the area, relating them to associated chemical and biological parameters. Incubation experiments will be carried out on-deck using filtered and unfiltered natural sea water and exposure to varying light treatments (+/- UV) to assess likely iodocarbon production and loss processes. In 2008, a full-scale, dedicated multidisciplinary biogeochemical cruise will include initial mapping of iodocarbon concentrations and associated surface hydrography, photochemical, chemical and biological variables, followed by on-station work. At least 6 stations will be occupied during the cruise with 24-h sampling of air and seawater iodocarbons and ancillary parameter monitoring over a minimum of 4 days in the same water patch marked with drifting buoys. *In situ* measurements will be accompanied by on-deck incubation experiments.

Meeting between the data management team and the PI has not yet taken place. Estimate of the data management effort required to support this project is mainly based on the initial proposal. The assumptions are that the additional data collected during the cruise in 2007 will only represent an extra 15 days of data

management effort while the dedicated cruise in 2008 will be a standard biogeochemical cruise with standard underway and CTD instrumentation, and a maximum of 35 individual data sets.

SDC tasks

The data management tasks below only relate to work at sea (i.e. they do not include the management of Cape Verde observatory data, nor that of data from laboratory experiments or modelling studies which are the responsibility of the PI).

- Acquire data from the first cruise within 6 month of cruise ending.
- Reformat water bottle and air sample data files and load to database.
- Acquire data from on-board bioassay experiments no more than 1 year after fieldwork ended.
- Attend cruise planning and post-cruise meetings.
- Acquire ROSCOP, cruise report, sampling logs, and UKORS' ship data backup within 3 months of cruise ending.
- Build up cruise data inventory
- Acquire processed CTD and continuous underway data, water bottle and air samples data, and satellite data no more than six months after collection or analyses.
- Acquire fully processed FRRF and bio-optics data as above.
- Acquire data from on-board bioassay experiments no more than 1 year after fieldwork ended.
- Reformat water bottle data files and load to database.
- Transfer CTD and underway data to BODC format, visually screen data for spikes of non-oceanographic origin, apply flags, and load to database.
- Calibrate CTD and underway salinity, fluorescence and oxygen channels against available water sample measurements.
- Reformat atmospheric data and load to database.
- Reformat FRRF and bio-optics data and load to database.
- Reformat data from bioassay experiments and production incubations and load to database.
- Create documentation about the instruments, analyses, processing, calibrations, quality control procedures and data quality.
- Advertise availability of dataset.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Bank data from first cruise Provide data management support for second cruise.
2008-09	Build up data inventory for second cruise. Bank data from second cruise.
2009-10	Complete data banking from second cruise.

NE/D006570/1 – Gordon McFiggans (RHAMBLE)

Project data summary

The project involves extensive measurements based around the role of reactive halogen species in the marine atmosphere and runs over 2 years.

A large number of instruments will be deployed but the data management task will be eased by the existing relationships between the SDC and the atmospheric chemistry community instrument scientists. Some of the instruments and scientists are known to the SDC as part of the Universities Facility for Atmospheric Measurement and the Facility for Airborne Atmospheric Measurements (FAAM). Previous projects such as NAMBLEX were handled by the SDC and thus metadata and formatting standards are already agreed for some of the instruments.

The project will take both open ocean and coastal measurements. There are two aspects to the open ocean work; the first will give a dataset of in situ measurements of all major participating species for halogen chemistry by supplementing measurements at the SOLAS observatory at Cape Verde off western Africa. 1 to 1.5 years of Differential Optical Absorption Spectroscopy (DOAS) measurements will be made and for an

intense observation in summer 2007 a fluorescence assay by gas expansion (FAGE) instrument. Many other instruments will be deployed including a tower with meteorological and radiometric measurements, sonde launches, gas-phase trace species measurements and aerosol size distributions.

The second open ocean aspect envisages one oceanic cruise with surface monitoring only (no hydrographical stations). The ship will transect from the UK down to Cape Verde and the cruise is scheduled for summer 2007. Instrumentation will include a compact version of FAGE developed for FAAM.

The coastal measurements will be in July/August 2006 at Roscoff in Brittany. A new Relaxed Eddy Accumulation instrument is planned to be deployed.

SDC tasks

- Archival of data from coastal, Cape Verde and cruise within 6 months of collection.
- Provision of meteorological information to help decide the exact geographical positioning of the cruise.
- Formatting support for use of standard formats particularly for new instruments such as the Relaxed Eddy Accumulation instrument.
- Support for metadata collection to the level required by the Climate and Forecasting metadata standards.
- Provision of data to the SOLAS community e.g. NE/C001915/1 – Ken Carslaw needs the data to constrain modelling work.
- Service requests for data from SOLAS participants.
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Submission tools for web and ftp-based uploading to the SDC
- Web pages describing the data available at the SDC.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2006-07	Support to scientists on formats and metadata Archival of coastal study data Archival of Cape Verde data
2007-08	Continue Cape Verde data and add intensive 6 week study data Attendance of campaign planning meeting Archival of cruise data Release of 2006-07 data to SOLAS community
2008-09	Archival of late data, update of documentation and web page, archive tidying Release of 2006-07 data to public Release of 2007-08 data to SOLAS community
2009-10	Release of 2007-08 data to public

NE/E011357/1 – Paul Monks

Project data summary

This project investigates the influences of peroxy radicals and oxygenated volatile organic compounds (OVOCs) on the oxidative chemistry of the tropical marine boundary layer. Field measurements at the Cape Verde Observatory, during summer 2007 to coincide with RHAMBLE cruise D319, will focus on radical concentrations, volatile organic compounds (VOCs) and OVOCs, and photolysis frequencies.

In combination with data from other, related UK SOLAS projects, the results of the fieldwork will contribute to the establishment of a model simulation of the oxidative chemistry of the region.

SDC Tasks

- Formatting support for use of standard formats.

- Support for metadata collection to the level required by the Climate and Forecasting metadata standards.
- Acquire data no more than 6 months after completion of analysis
- Service requests for data from SOLAS participants
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.
- Submission tools for web and ftp-based uploading.
- Web pages describing the data available at the data centre

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Support to scientists on formats and metadata Archival of Cape Verde data
2008-09	Archival of late data, update of documentation and web page, archive tidying Release of 2007-08 data to SOLAS community
2009-10	Release of 2007-08 data to public

NE/C001923/1 – Colin Murrell

Project data summary

This project aims to sample bacterioneuston from a variety of environments in order to determine the community structure of the bacterioneuston using genetic methods targeted at bacteria which metabolise CH₄, CO, methyl bromide (MeBr), methyl chloride (MeCl) and DMS, and which produce N₂O and DMS. The project will also measure the rates of invasive and evasive air-sea exchange of a number of atmospheric trace gases and investigate the role of the microbial populations on gas exchange rates.

Based on the initial proposal and information gathered during other meetings, it is understood that samples will be collected from Newcastle coastal waters, the L4 Plymouth station, during the DOGEE 1 and 2 cruises in 2006 and 2007, and during the INSPIRE cruise in 2008. Neuston samples will be paired with bulk seawater samples in order to compare results from the two environments. A number of controlled tank incubation will also be carried out to investigate the effect of metabolism of the targeted compounds on their air-sea exchange rate under condition of super- and under-saturation.

SDC tasks

The main data management tasks will consist of:

- Acquire inventory and description of sampling activities and incubation experiments.
- Acquire catalogue of DNA samples extracted from bulk seawater and neuston samples, along with precise metadata information, and description of corresponding sampling techniques and samples' treatments (within 3 months of fieldwork ending).
- Acquire data from cruises (e.g. bacterial abundance, genetic sequences and/or GENBANK accession numbers, digital images of DGGE gels).
- Bank SOLAS cruise data in BODC's database.
- Archive and catalogue data from other fieldwork activities.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2006-07	Acquire samples inventory from DOGEE 1 and 2 cruises.
2007-08	Acquire samples inventory from INSPIRE cruise and from other sites.
2008-09	Acquire data from SOLAS cruises. Acquire data and/or reference to external databases or curating centre for non-SOLAS cruises sampling sites.
2009-10	Bank cruise data in BODC databases.

NE/E011446/1 – Colin MurrellProject data summary

This project investigates the impact of enhanced biological activity during a phytoplankton bloom on properties of the sea surface microlayer. In particular, work focuses on microbial effects on the chemistry and air-sea transfer of climatically-important trace gases, such as dimethyl sulphide (DMS), oxides of nitrogen, methane, methyl halides and methanol. Experimental work will be conducted in conjunction with the Bergen Mesocosm experiments. Measurements will include microbial community structure within the sea surface microlayer, RNA and DNA, functional gene expression, biogenic surfactant concentrations, biogenic gas production, and air-sea gas exchange. These are to be compared with in situ data collected during fieldwork for other, related UK SOLAS projects.

SDC Tasks

- Acquire data no more than 6 months after completion of analysis
- Reformat data and load to database
- Service requests for data from SOLAS participants
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Support to scientists on formats and metadata
2008-09	Archival of mesocosm experiment data Release of 2007-08 data to SOLAS community.
2009-10	Archival of late data, update of documentation and web page, archive tidying. Release of 2007-08 data to public.

NE/C517192/1 – Phil NightingaleProject data summary

This project aims to develop a reliable method for measuring methanol and possibly a number of other OVOCs (Oxygenated Volatile Organic Compounds) compounds in seawater and to apply it to investigate the sources and sinks of OVOCs in seawater. The initial development work will be carried out on samples collected from PML's L4 station. The method will then be used at sea during the DOGEE 2 cruise in 2007 and during the "upwelling" cruise now scheduled for 2008. Measured variables will include OVOCs (mainly methanol) *in situ* concentrations in surface waters, a number of concentration profiles in the sub-surface microlayer sampled from a zodiac, a limited number of measurements from discrete air samples, and methanol uptake rates from a series of time-course measurements of methanol concentration from on-deck incubation experiments. A number of ancillary measurements might be necessary during the DOGEE 2 cruise and will include: DOC or CDOM concentrations, bacterial production rates and community composition using microscopic analyses or/and flow cytometry.

SDC tasks1) *Method development phase at the L4 station*

No data management task is expected to take place with regards to the method development phase.

2) *Cruise data*

In situ measurements and measurements from the incubation experiments carried out during the cruises will be banked in BODC's database alongside other data collected during these cruises.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Acquire and bank data from DOGEE 2 cruise
2008-09	Acquire and bank data from UPWELLING cruise

NE/E011489/1 – Phil Nightingale

Project data summary

This project seeks to evaluate the air-sea transfer velocity of dimethyl sulphide (DMS) during the UK SOLAS DOGEE experiment, and to establish the importance of solubility in air-sea gas transfer. The importance of horizontal and vertical gradients in DMS concentration on estimating DMS fluxes will also be assessed.

Fieldwork will involve participation in the UK SOLAS DOGEE cruise (D320 in June-July 2007), during which other groups will make complementary measurements of atmospheric DMS and gas fluxes.

SDC Tasks

- Acquire data no more than 6 months after completion of fieldwork or analysis.
- Reformat data and load to database.
- Service requests for data from SOLAS participants.
- Protect archive for the periods stated in the SOLAS data protocol and release data publicly at agreed time.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Support to scientists on formats and metadata Archival of flux and concentration data
2008-09	Archival of late data, update of documentation and web page, archive tidying Release of 2007-08 data to SOLAS community
2009-10	Release of 2007-08 data to public

NE/C517176/1 – Carol Robinson

Project data summary

This project is centred around a single 5-week cruise in the upwelling region off NW Africa. The cruise was initially scheduled for May-June 2006 but unexpected delays in ship's repairs forced it to be re-scheduled to 2008.

The main purpose of the cruise is to conduct a lagrangian experiment in an upwelling plume in order to determine the impact of coastal upwellings on the supply, loss and air-sea exchange of trace and biogenic gases through upwelling, photochemical and biological degradation of organic matter, and changes in plankton community structure and activities. The fieldwork activities will consist of an initial mesoscale survey of the area using continuously recording instrumentation (MVP, FRRF, AFC, ADCP, AutoFlux and pCO₂), then a release of drifters and SF₆ tracer to mark a patch of water, followed by a series of intensive underway surface water and atmospheric sampling alongside CTD profiles and rosette sampling in and out of the SF₆ patch. A large suite of physical, biogeochemical and bio-optical parameters will be measured either directly *in situ*, on water samples or during daily incubation experiments for production measurements and photo-oxidation studies. The study will be complemented by a short survey across the section of the upwelling filament when the full suite of physical, chemical and biological measurements will be conducted. Depending on prevailing conditions, the full operation cycle may be repeated twice during the cruise.

SDC tasks

The main tasks for this project will all be related to data acquired at sea during the single open ocean cruise.

- Attend cruise planning and post-cruise meetings.

- Acquire ROSCOP, cruise report, sampling logs, and UKORS' ship data backup within 3 months of fieldwork ending.
- Build up cruise data inventory.
- Acquire processed ship's continuous underway, AutoFlux, AFC, pCO₂, CTD, MVP, FRRF, bio-optical and ADCP data, water bottle sample analyses, and atmospheric data no more than six months after collection or analyses.
- Acquire data from on-board bioassay and production experiments no more than 8 months after data collection.
- Reformat water bottle data files and load to database.
- Transfer CTD, MVP and underway data to BODC format, visually screen the data for spikes of non-oceanographic origin, apply flags, and load data to database.
- Calibrate CTD and underway salinity, fluorescence and oxygen channels against available water sample measurements.
- Reformat ADCP data and load in database.
- Reformat data from bioassay experiments and load to database.
- Create documentation about the instruments, analyses, processing, calibrations, quality control procedures and data quality.
- Advertise availability of dataset.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2007-08	Provide cruise data management support.
2008-09	Build up data inventory. Acquire and bank cruise data.
2009-10	Complete data banking.

Note: the re-scheduling of the cruise from May-June 2006 to early summer 2008 will mean that an extra 6 months will be required at the end of the programme in order to complete the data management project and publish the final UK-SOLAS data set. The final date for completion will therefore need to be revised to September 2010 instead of March 2010 (with associated extra data management costs)..

NE/C001702/1 – Rob Upstill-Goddard (DOGEE)

Project data summary

This project will conduct two lagrangian ship-based experiments using ³He and SF₆ dual tracers releases. The first experiment scheduled for Nov-Dec 2006 will be a single patch experiment in relatively high seas conditions. For the second experiment, two patches of water at close proximity to one another will be labelled with the dual tracers technique. In order to study the effect of surfactant on air-sea exchange processes, a naturally occurring surfactant will be added to one patch while the second patch acts as the control. This experiment will require calm seas and high productivity and has been planned for May-June 2007. Data collection during these cruises will be mainly from surface underway atmospheric and near surface water column sampling using the ship's non-toxic and shallow CTD casts as well as from drifting buoy and ship-borne instrumentation such as the AutoFlux system and the wave recorder. Additional measurements will be obtained from collaborators either within the programme (close links with other projects e.g. Smith et al, Yelland et al) or external collaboration (e.g. collaboration with US scientists for deployment of multi-sensors *in situ* recording instruments).

SDC tasks

For both cruises:

- Attend cruise planning and post-cruise meetings.
- Acquire ROSCOP, cruise reports, sampling logs, and UKORS' ship data backup within 3 months of fieldwork ending.
- Build up cruise data inventory.
- Acquire satellite images.

- Acquire ship's continuous underway, CTD and rosette sampling processed data, transfer to BODC file format, screen, calibrate sensor values against water sampling as necessary, and bank in database.
- Acquire water bottle data (SF₆, ³He, and surfactant concentrations), reformat and load in database.
- Acquire DMS concentrations in air and water
- Acquire methyl halide concentrations in air and water
- Acquire data from samples collected with surface skimmer
- Acquire fully processed drifting buoy data with surface temperature and salinity profiles.
- Acquire AutoFlux mean meteorological parameter data set and fully processed flux data set
- Acquire fully processed 1-D wave spectra from Ship-borne Wave Recorder
- Acquire sea surf digital images and hourly whitecap fraction data
- Catalogue sea surf images and bank in database.
- Convert numerical data files to BODC file format and bank in database.
- Acquire fully processed final data set from US collaborators (Air Sea Interaction Spar –ASIS- buoy, Air Sea Interaction Profiler –ASIP-, multi-sensor lagrangian float data).
- Create documentation about the instruments, analyses, processing, calibrations, quality control procedures and data quality.
- Advertise availability of data sets.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
2006-07	Provide data management support for first cruise. Build up data inventory for first cruise.
2007-08	Bank data from first cruise. Provide data management support for second cruise. Build up data inventory for second cruise. Bank data from second cruise.
2008-09	Complete data banking from second cruise.

NE/C001826/1 – Margaret Yelland (HiWASE)

Project data summary

This project will acquire data from instruments mounted on the Norwegian ocean weather ship '*Polarfront*' during a period of 2 years starting from September 2006. The ship operates within a 10 km² box centred on station Mike (66N, 2E) and comes back to port once a month to refuel being off station for a maximum of 18 hours every month. The set of instruments to be mounted on the *Polarfront* includes the AutoFlux system possibly equipped with a radiometer, plus a digital camera system, an underway pCO₂ sensor (operated by external collaborators from Bergen University, Norway) and an underway wave radar system. These instruments will be recording in near continuous mode during the two-year period. Summary and diagnostic data will be transmitted every hour via satellite and displayed daily on the project web site. The data will also be retrieved every three months when the ship is in port.

SDC tasks

- Acquire and bank AutoFlux mean meteorological parameters data files every three months.
- Acquire and bank final processed flux data from high frequency measurements.
- Acquire wave radar data.
- Acquire sea surf digital images and hourly whitecap fraction data.
- Catalogue sea surf images and bank in database.
- Convert all numerical data files to BODC file format and bank in database.
- Archive external collaborators' data from Ship-borne Wave recorder (Norwegian Met Office) and underway pCO₂ sensor (Bergen University, Norway) if collaborators agree to archive these data with the SDC.

SDC milestones (approximate) based on the points listed above:

Year	SDC Task
------	----------

UK SOLAS Data Management Plan

2006-07	Start 3-monthly acquisition and banking of mean AutoFlux data, wave data and images
2007-08	Continue 3-monthly acquisition and banking of mean AutoFlux data, wave data and images
2008-09	Complete 3-monthly acquisition and banking of mean AutoFlux data, wave data and images Acquire and bank HiWASE final flux data.
2009-10	Complete banking of HiWASE data.