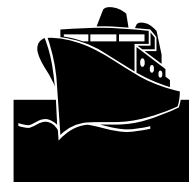


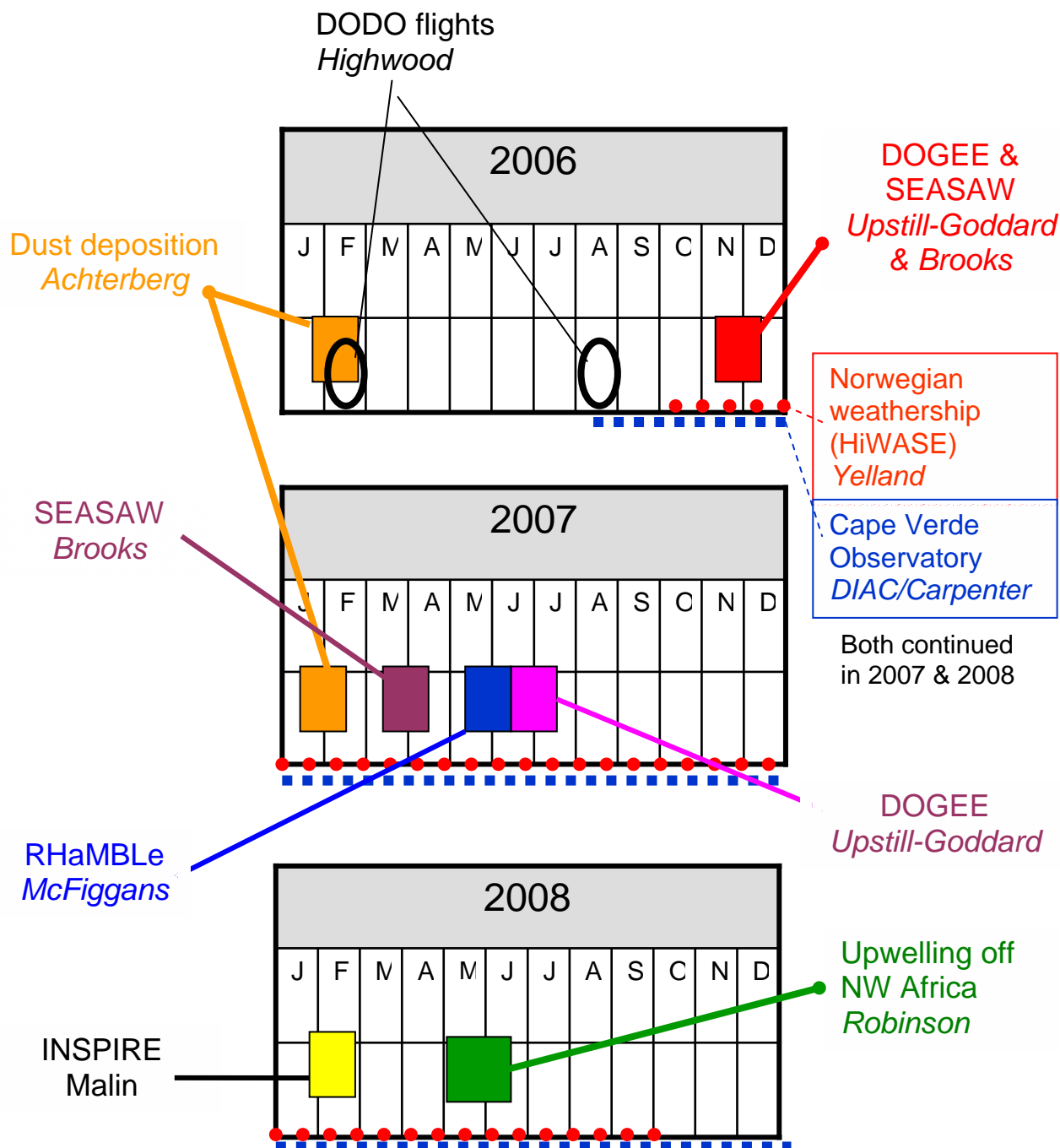


# UK SOLAS fieldwork plans 2006 - 08

July 2006



Additional information on achieved, approved and proposed research cruises is attached. Note that ship schedules are not yet confirmed for 2007 and 2008. DIAC, Distributed Institute for Atmospheric Chemistry; DODO, dust outflow and deposition to the ocean; DOGEE, deep ocean gas exchange experiment; HIWASE, high wind air-sea exchanges, INSPIRE, investigation of near-surface production of iodocarbons – rates and exchanges; RHaMBLe, reactive halogens in the marine boundary layer; SEASAW, field observations of sea spray, gas fluxes and whitecaps.



# Summary of UK SOLAS research cruises: 2006 - 08

Excluding time series studies on Norwegian weathership *RV Polarfront*. PS, Principal Scientist

## 2006

### Impact of atmospheric dust derived metal and nutrient inputs on near-surface plankton micro-biota in the tropical North Atlantic (cruise #1)

<b>PS</b> <b>Eric Achterberg</b> National Oceanography Centre, Southampton <a href="mailto:eric@noc.soton.ac.uk">eric@noc.soton.ac.uk</a>	
<i>Where</i> Off NW Africa: start/ end in Canaries (Las Palmas); port call in Mindelo, Cape Verde	<i>When</i> 26 Jan – 23 Feb 2006
<i>Objectives/main measurements</i> To study effects of atmospherically-derived Saharan dust on marine biogeochemistry. Measurements include upper ocean nutrients and trace metals (at nanomolar levels, including iron and aluminium); chlorophyll and other phytoplankton pigments (HPLC on return to lab); particulate and dissolved organic carbon and nitrogen; nitrogen fixation; phytoplankton photosynthesis using FRRF; and atmospheric sampling and analysis using high volume aerosol collectors and ATOFMS. Also incubation experiments and CTD-based analysis of water column structure.	
<i>Status</i> Major aims successfully met, on <i>FS Poseidon</i> (cruise 332). Other participants from University of Birmingham and UEA. Linkage with UK SOLAS aircraft campaign (DODO, with DABEX and AMMA), but no direct overflights	

### DOGEE: the deep ocean gas exchange experiment (cruise #1; with SEASAW, field observations of sea spray, gas fluxes and whitecaps)

<b>PS</b> <b>Rob Upstill-Goddard</b> Marine Science & Technology, University of Newcastle upon Tyne <a href="mailto:Rob.goddard@ncl.ac.uk">Rob.goddard@ncl.ac.uk</a>	
<i>Where</i> NE Atlantic: start/end in Clyde (Port Glasgow)	<i>When</i> 6 Nov – 14 Dec 2006
<i>Objectives/main measurements</i> To study fundamental controls of air-sea gas exchange. Measurements include whitecap coverage, wave breaking and bubble production; wind speed, air temperature, sea surface temperature and humidity; IR surface temperature, downwelling long- and short-wave radiation and air pressure; air-sea fluxes of CO <sub>2</sub> , sensible heat, latent heat and momentum (EC and inertial dissipation). Also quantification of flow distortion biases using computation fluid dynamics, and collection of sea surface micro-layer samples.	
<i>Status</i> Scheduled cruise: <i>RRS Discovery 313</i> . Other national and international participants from PML, Leeds, NOC Southampton/UoS, UEA, Lamont-Doherty and Rhode Island. <u>No spare berths envisaged.</u>	

## 2007 *Shiptime provisional, not yet formally scheduled*

### Impact of atmospheric dust derived metal and nutrient inputs on near-surface plankton microbiota in the tropical North Atlantic (cruise #2)

<b>PS</b> <b>Eric Achterberg</b> National Oceanography Centre, Southampton <a href="mailto:eric@noc.soton.ac.uk">eric@noc.soton.ac.uk</a>	
<i>Where</i> Off NW Africa: start/end in Canaries (Teneriffe); some work near Cape Verde	<i>When</i> 18 Jan – 26 Feb 2007
<i>Objectives/main measurements</i> To study effects of atmospherically-derived Saharan dust on marine biogeochemistry. Measurements include upper ocean nutrients and trace metals (at nanomolar levels, including iron and aluminium); chlorophyll and other phytoplankton pigments (HPLC on return to lab); particulate and dissolved organic carbon and nitrogen; nitrogen fixation; phytoplankton photosynthesis using FRRF; and atmospheric sampling and analysis using high volume aerosol collectors and ATOFMS. In addition to CTD-based analysis of water column structure and incubation experiments using nutrient additions, other participating UK SOLAS groups will investigate iodocarbon dynamics, and the role of DMSP and GBT in protection from photo-inhibition and photooxidative stress.	

*Status* Cruise provisionally on *RRS Discovery* (cruise 314). Participants expected to include researchers from UEA, Univ of Birmingham, Univ of Essex and/or PML. Linkage with INSPIRE (Investigation of near-surface production of iodocarbons - rates and exchanges). No spare berths envisaged.

### SEASAW: field observations of sea spray, gas fluxes and whitecaps

<i>PS</i>	<b>Ian Brooks</b> School of Earth and Environment, University of Leeds <a href="mailto:ibrooks@env.leeds.ac.uk">ibrooks@env.leeds.ac.uk</a>
<i>Where</i>	NE Atlantic: Start, UK port; end, Vigo (Spain)
<i>When</i>	Late Mar -mid Apr 2007
<i>Objectives/main measurements</i> To study fundamental controls of air-sea gas exchange, with emphasis on sea-spray and other wind-driven effects. Measurements include whitecap coverage and wave breaking; bubble production by breaking waves; suite of meteorological parameters (including high resolution wind data); and aerosol characterisation using CLASP (Compact Lightweight Aerosol Spectrometer Probe) and ATOFMS (Aerosol Time of Flight Mass Spectrometer).	
<i>Status</i> Cruise provisionally on <i>RRS Discovery</i> (cruise 317). Participants expected to include researchers from NOC Southampton. <u>Opportunity for additional participation</u> for complementary work (note: limited water sampling).	

### RHaMBLe: Reactive halogens in the marine boundary layer

<i>PS</i>	<b>Gordon McFiggans</b> Earth, Atmospheric & Environmental Science, University of Manchester <a href="mailto:g.mcfiggans@manchester.ac.uk">g.mcfiggans@manchester.ac.uk</a>
<i>Where</i>	Transect to/from and work upwind of Cape Verde. Start, Lisbon; end, Falmouth
<i>When</i>	Mid May -mid Jun 2007
<i>Objectives/main measurements</i> To quantify marine halogen cycling and investigate its spatial / latitudinal variability, and determine the effects on atmospheric oxidative chemistry. Measurements of trace molecules and radicals using GC/MS, BBCEAS (Broadband Cavity Enhanced Absorption Spectroscopy) and a compact version of the FAGE system and of aerosol physical distributions using mobility and optical probes.	
<i>Status</i> Cruise provisionally on <i>RRS Discovery</i> (cruise 319). Participants expected to include researchers from York, Leeds and Leicester. <u>Opportunity for additional participation</u> for complementary work (note: limited water sampling and hydrographic analyses: underway sampling only).	

### DOGEE: the deep ocean gas exchange experiment (cruise #2)

<i>PS</i>	<b>Rob Upstill-Goddard</b> Marine Science & Technology, University of Newcastle upon Tyne <a href="mailto:Rob.goddard@ncl.ac.uk">Rob.goddard@ncl.ac.uk</a>
<i>Where</i>	NE Atlantic: start, Falmouth; end, Clyde
<i>When</i>	Mid-Jun – mid Jul 2007
<i>Objectives/main measurements</i> To study controls of air-sea gas exchange through a range of approaches, including dual-tracer ( <sup>3</sup> He and SF <sub>6</sub> ) release experiments. One release will involve two patches in close proximity; one labelled with N-acetyl-D-glucosamine to mimic the role of surface organic slicks in gas transfer. Other measurements likely to include whitecap coverage and wave breaking; bubble production by breaking waves; wind speed, air temperature, sea surface temperature and humidity; IR surface temperature, downwelling long- and short-wave radiation and air pressure; air-sea fluxes of CO <sub>2</sub> , sensible heat, latent heat and momentum (EC and inertial dissipation). Also collection of sea surface microlayer samples.	
<i>Status</i> Scheduled cruise: <i>RRS Discovery</i> (cruise 320). Other national and international participants expected to include researchers from PML, Leeds, NOC Southampton/UoS, UEA, Lamon-Doherty and Rhode Island. <u>No spare berths envisaged.</u>	

2008 *Shiptime requested: not yet scheduled*

### **INSPIRE: Investigation of near-surface production of iodocarbons- rates and exchanges**

<b>PS Gill Malin</b> Environmental Sciences, University of East Anglia <a href="mailto:g.malin@uea.ac.uk">g.malin@uea.ac.uk</a>	
<i>Where</i> Off NW Africa (near Cape Verde)	<i>When</i> Jan-Feb 2008
<i>Objectives/main measurements</i> To determine the dominant biological, chemical, physical and photo-chemical iodocarbon production and loss processes in tropical Atlantic waters of varying productivity around Cape Verde. This will be achieved by mapping of iodocarbon concentrations and associated surface hydrographic, photochemical and biological variables, followed by on-station work (involving patch tracking, also on-deck incubation experiments).	
<i>Status</i> Requested research ship: <i>RRS Discovery</i> , <i>RRS James Cook</i> or similar. Other participants include researchers from PML. <u>Opportunities for additional participation</u> for complementary studies.	

### **The impact of coastal upwellings on air-sea exchange of climatically important gases**

<b>PS Carol Robinson</b> Plymouth Marine Laboratory <a href="mailto:crob@pml.ac.uk">crob@pml.ac.uk</a>	
<i>Where</i> Off NW Africa (Mauritanian upwelling)	<i>When</i> May-Jun 2008
<i>Objectives/main measurements</i> To determine the role of upwelling on the supply, loss and air-sea exchange of trace and biogenic gases. To determine the photochemical and biological fate of upwelled and recently produced dissolved organic matter and its role in air-sea exchange of climatically important trace gases. To determine the impact of nutrient enriched upwelled water on the spatial and temporal variability of plankton community structure and activity and resultant influence on biogenic gas flux.	
<i>Status</i> Cruise originally scheduled for 2006. Requested research ship: <i>RRS Discovery</i> , <i>RRS James Cook</i> or similar. Other participants include researchers from NOC Southampton, Vigo (Spain) and NIWAR (New Zealand). <u>No spare berths envisaged</u> (assuming scheduling on <i>RRS Discovery</i> ).	

For further information on the above research cruises (and the feasibility of additional work) contact the named Principal Scientists or the UK SOLAS Science Coordinator [p.williamson@uea.ac.uk](mailto:p.williamson@uea.ac.uk)