SOLAS Project Integration and COST Action 735

by Tom Bell

1. Scientific Highlights and Achievements

DMS database and climatology (DMS-GO)

- Project with Rafel Simo, Arancha Lana, Eric Peter Liss, Saltzman, Peter Liss, Jacqueline Stefels, Jamie Kettle, Jim Johnson and Sergio Vallina.
- Facilitated by SOLAS Project Integration, a substantial increase in size (a tripling in the number of data points) and spatial extent of the freely-available DMS database.
- A re-estimate, using the expanded database of the global [DMS] climatology following the work of Kettle et al. (1999).
- Output/project is almost complete and suggests a significant change in estimated DMS emissions from the global ocean from ~22 to ~28 Tg S yr^{-1} (will be made available as new input fields for atmospheric models).
- A 1x1 gridded product for oceanic model validation and error/uncertainty fields will also be produced.

Data-based estimate of iron deposition to the Atlantic Ocean (IRONMAP)

- Project with Alex Baker, Chris Adams and Tim Jickells.
- Atlantic database of >200 aerosol samples and >70 rain samples.
- Estimate based on database (to be added to) ~38 Gmol per year. Best model and satellite-based estimate (Jickells et al., 2005) ~133 Gmol per year.

2. Main activities (research projects, cruises, special events, workshops, outreach, capacity building etc)

Research projects

- IRONMAP project (NERC funded; PI Dr Alex Baker).
- DMS-GO (EUROCEANS-funded and COST STSM project)
- Ocean and atmosphere halocarbon data collation and flux estimate effort funded in part (Work Package 3) through EU project SHIVA (Stratospheric ozone: Halogens In a Varying Atmosphere; FP7-ENV-2007-1)
- Work at NOAA to produce climatologies of *k* using a combination of satellite-derived latent and sensible heat flux products (see http://oaflux.whoi.edu/) and the NOAA/COARE algorithm, which calculates *k* from first physical principles.

Relevant Workshops

- DMS-GO initial results discussion (Barcelona, Nov 08). EUROCEANS funded.
- Halocarbon intercalibration meeting (London, Feb 08). COST funded.
- *k* conundrum meeting (Norwich, Feb 08). COST funded.
- Long-lived climatically-active gases in the coastal environment meeting (Kiel, Jan 09). COST funded.
- Halocarbons in the Ocean and Atmosphere (HalOcAt) database meeting (Kiel, Feb 09). COST funded.
- Aerosol iron solubility meeting (Norwich, March 09). COST funded.

3. Publications in 2008 (Reports, articles, models, datasets, products, website etc)

Publications:

- Lana et al., An updated climatology of surface dimethylsulphide concentrations and flux to the atmosphere, GBC, *In Prep.*
- Adams et al., Estimation of atmospheric nutrient inputs to the Atlantic Ocean from 50°N to 50°S based on large-scale field sampling: II. Iron and other trace metals, GBC, *In Prep.*
- Butler et al., An identified need for the inter-calibration of short-lived halocarbon measurements in the marine environment and the scientific community's future plans, ACPD, *In Prep.*
- Johnson, M.T., Liss, P.S., Bell, T.G., Lesworth, T.J., Baker, A.R., Hind, A.J., Jickells, T.D., Biswas, K.F., Woodward, E.M.S. and Gibb, S.W., 2008. Field observations of the ocean-atmosphere exchange of ammonia: Fundamental importance of temperature as revealed by a comparison of high and low latitudes. Global Biogeochemical Cycles, 22(1): art. no.-GB1019.
- Freing et al., 2009, North Atlantic production of nitrous oxide in the context of changing atmospheric

levels, GBC, *Submitted*.
- Freing et al., Present and past North Atlantic emissions of nitrous oxide, *In Prep.*
- Bange et al., A plea for contributions to a database of oceanic and coastal nitrous oxide and methane measurements, Env. Chem., *In Prep.*

Other Reports:
Meeting/workshop reports (see http://www.cost-735.org/meetings/meetings.html)
SOLAS Newsletter article (Issue #7, Dec 2008)

4. Interactions and Collaborations

- Interaction(s) between SOLAS Project Integration and COST have substantially improved and are now far more effective (hence the number of meetings/workshops).
- Support is needed for the SOLAS IPO to be able to cope with this (particularly as the Project Integration contract runs out at the end of Nov. 09).
- MarinE MethanE and Nitrous Oxide (MEMENTO) initiative.
- Halocarbons in the Ocean and Atmosphere (HalOcAt) database initiative.
- Future workshops:
  - Marine boundary layer ozone
  - Carbon workshop?

5. Goals and Plans for Future Activities

Funding dependent as current grant ends in Nov 2009.
3rd March deadline for renewal bid.
Future activities could include:
- Development of DMS climatology using dynamic provinces rather than static Longhurst provinces.
- Extrapolation of IRONMAP to global ocean.
- Facilitation, development and utilisation of HalOcAct and MEMENTO initiatives.
- Global database of atmospheric DMS oxidation products for model validation.
- Full data synthesis of Fe addition experiments.
- Synthesis of current understanding of particle deposition velocity.

6. Other Comments

As stated above, the SOLAS IPO cannot effectively run SOLAS as well as the COST workshops (especially with their current level of activity) with current staffing levels. Hannah Mossman (short-term contract for 3 months) has helped considerably but this is not a long-term solution. Funding should be prioritised toward this in order to maximise efficient use of COST monies and maximise SOLAS activities such as the summer school and SOLAS OSC.

Keep up-to-date with the SOLAS Project Integration and COST Action 735 projects via http://www.cost-735.org/ and http://www.bodc.ac.uk/solas_integration/.