Surface Ocean – Lower Atmosphere Study (SOLAS)

An IGBP project (2004), approaching 10 years…

…to understand the key biogeochemical-physical interactions and feedbacks between the ocean and atmosphere. Achievement of this goal is important to understand and quantify the role that ocean-atmosphere interactions play in the regulation of climate and global change.

Focus 1: Biogeochemical Interactions and Feedbacks Between Ocean and Atmosphere

Focus 2: Exchange Processes at the Air-Sea Interface and the Role of Transport and Transformation in the Atmospheric and Oceanic Boundary Layers

Focus 3: Air-Sea Flux of CO2 and Other Long-Lived Radiatively Active Gases

Science and Implementation Plan

…vintage 2006

- Focus 1: Quantify the Biogeochemical Interactions and Feedbacks Between the Ocean and Atmosphere.
- Focus 2: Understand the Exchange Processes at the Air-Sea Interface and the Role of Transport and Transformation in the Atmospheric and Oceanic Boundary Layers.
- Focus 3: Characterize Air-Sea Flux of Carbon Dioxide (CO2) and Other Long-Lived Radiatively Active Gases.
- Focus 4: Promote Enabling Technologies, Outreach, and Data Management.

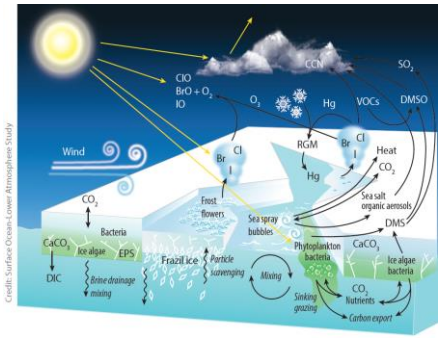
Describes 4 projects for each focus: *NafDAE, OASIS, CLIMIS, HiT-US, ALPS, NACP, CLIVAR, TAO, CARBOOCEAN, VOCALS, ORION, etc., etc.*

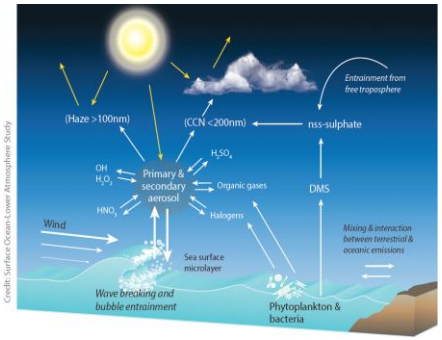
http://data.bco-dmo.org/US_SOLAS/US-SOLAS_Science_Implementation_Strategy.pdf

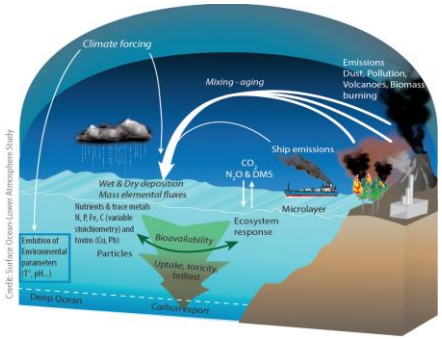
Surface Ocean – Lower Atmosphere Study (SOLAS)

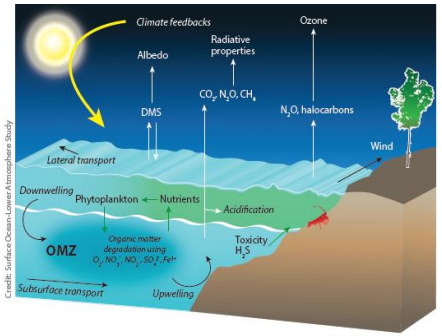
5yrs in…. Midterm Strategies:

- *Sea-ice biogeochemistry and interactions with the atmosphere*
- *Ocean-derived aerosols: production, evolution and impacts*
- *Atmospheric control of nutrient cycling and production in the surface ocean*
- *Air-sea gas fluxes at Eastern boundary upwelling and Oxygen Minimum Zone (OMZ) systems*



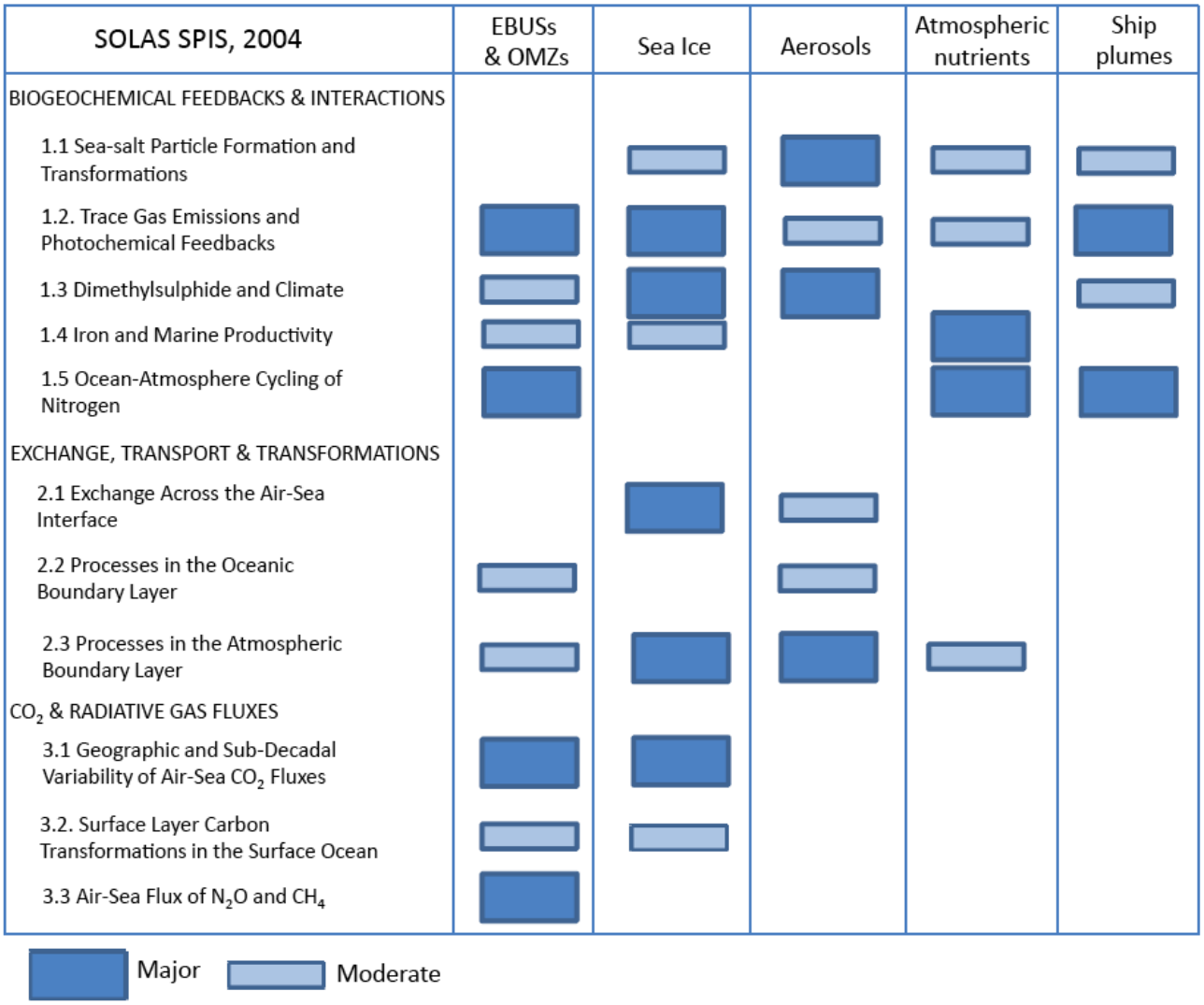






`Evolving Research Directions in Surface Ocean-Lower Atmosphere (SOLAS) Science` by Cliff Law et al. in Environmental Chemistry 2013, 10, 1-16.

Original Science Plan *Midterm Strategies*



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Surface Ocean – Lower Atmosphere Study (SOLAS)

Currently:

- **Chair, Scientific Steering Committee:** Eric Saltzman, UC Irvine
- **Parent Programmes:** ICAGCP, IGBP, SCOR, WCRP
- **Funding:** German Ministry Education and Research, GEOMAR, NSF (through SCOR), IGBP, State Key Laboratory (China)
- **12 Endorsed Projects:** 2 US-led (WACS-II , OASIS)
- **30 National Representatives:** Southern Africa (1), Asia (7), Europe (12), Australia (2), South America (3), North America (3)

Surface Ocean – Lower Atmosphere Study (SOLAS)

Future SOLAS:

…During the next phase, SOLAS will seek to continue its relationship with current sponsors SCOR, WCRP and iCACGP. The IGBP is winding down, and SOLAS has been invited to seek sponsorship from the new Future Earth Initiative.

Surface Ocean – Lower Atmosphere Study (SOLAS)

Future SOLAS Strategies: White Paper

- Theme 1: Greenhouse gases and the oceans
- Theme 2: The air-sea interface and fluxes of mass, energy
- Theme 3: Atmospheric nutrient and particles supply to the surface ocean
- Theme 4: Interconnections between aerosols, clouds, and ecosystems
- Theme 5: Ocean emission and tropospheric oxidizing capacity
- Theme 6: Interconnections between ocean biogeochemistry and stratospheric chemistry
- Theme 7: Multiple stressors and ocean ecosystems
- Theme 8: High Sensitivity Systems – HS^2

http://www.solas-int.org/about/future_solas.html

SOLAS Science

…vintage 2014

- Transition to Future Earth = New Opportunity for collaboration and integration
- Collect the Community and Promote New Initiatives / Future Earth
  - Use endorsement mechanism at international level, consolidate information at the national level
- Ongoing research at the interface – ad hoc aggregation of excellent SOLAS research: embedded in many current US programs.
- NASA in particular, operates in the SOLAS domain: Surface Ocean – Lower Atmosphere (PACE, ICESCAPES, etc., …… ICESOCC!)

Earth Observation for Ocean-Atmosphere Interactions Science 2014

Responding to the new scientific challenges of SOLAS

Co-organised by ESA, SOLAS and EGU

28th-31st October 2014

European Space Agency

ESRIN,

Via Galileo Galilei

Frascati, 00044, Italy

Themes

Contributions are invited for presentations on novel research activities and developments exploiting EO data in support of atmosphere-ocean interaction studies.

Areas of interest and related topics of major concern are listed in the following:

- EO geo-information products and related uncertainties for ocean-atmosphere science;
- Novel EO missions and future observations for ocean-atmosphere interactions;
- EO as a tool to characterize air-sea interface and fluxes of mass and energy;
- Ocean-atmosphere greenhouse gas fluxes and air-sea gas transfer;
- EO of climatic active gases (including Halogen emissions and Iodine chemistry) in the marine boundary layer;
- EO of sea spray and aerosols and its interactions with clouds and ecosystems;
- EO for sea-ice-atmosphere interactions;
- Atmospheric control of nutrient cycling and supply to surface ocean;
- EO in biogeochemical modelling, stressors and ocean ecosystems;
- EO techniques relevant to ocean acidification;
- EO of atmosphere-ocean interactions on regional scales, such as air-sea gas fluxes at Eastern boundary upwelling and Oxygen Minimum Zone (OMZ) systems;
- EO data of anthropogenic sources (such as ship plumes) and their impacts on atmospheric chemistry, climate and nutrient supply to the oceans;
- EO of ocean emissions and tropospheric oxidizing capacity;
- EO for ocean biogeochemistry and its connections to stratospheric chemistry.
- Other ocean-atmosphere interaction science topics

http://www.eo4oceanatmosphere2014.info

Abstracts Due: May 16

15 areas of interest

Thanks

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