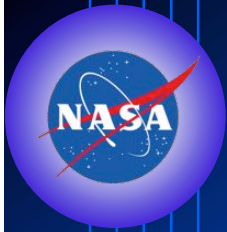




2007 NASA Ocean Color Research Team Meeting

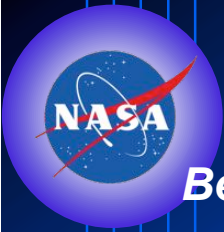
Feedback and Action Items

Paula Bontempi
NASA Headquarters
11-13 April 2007



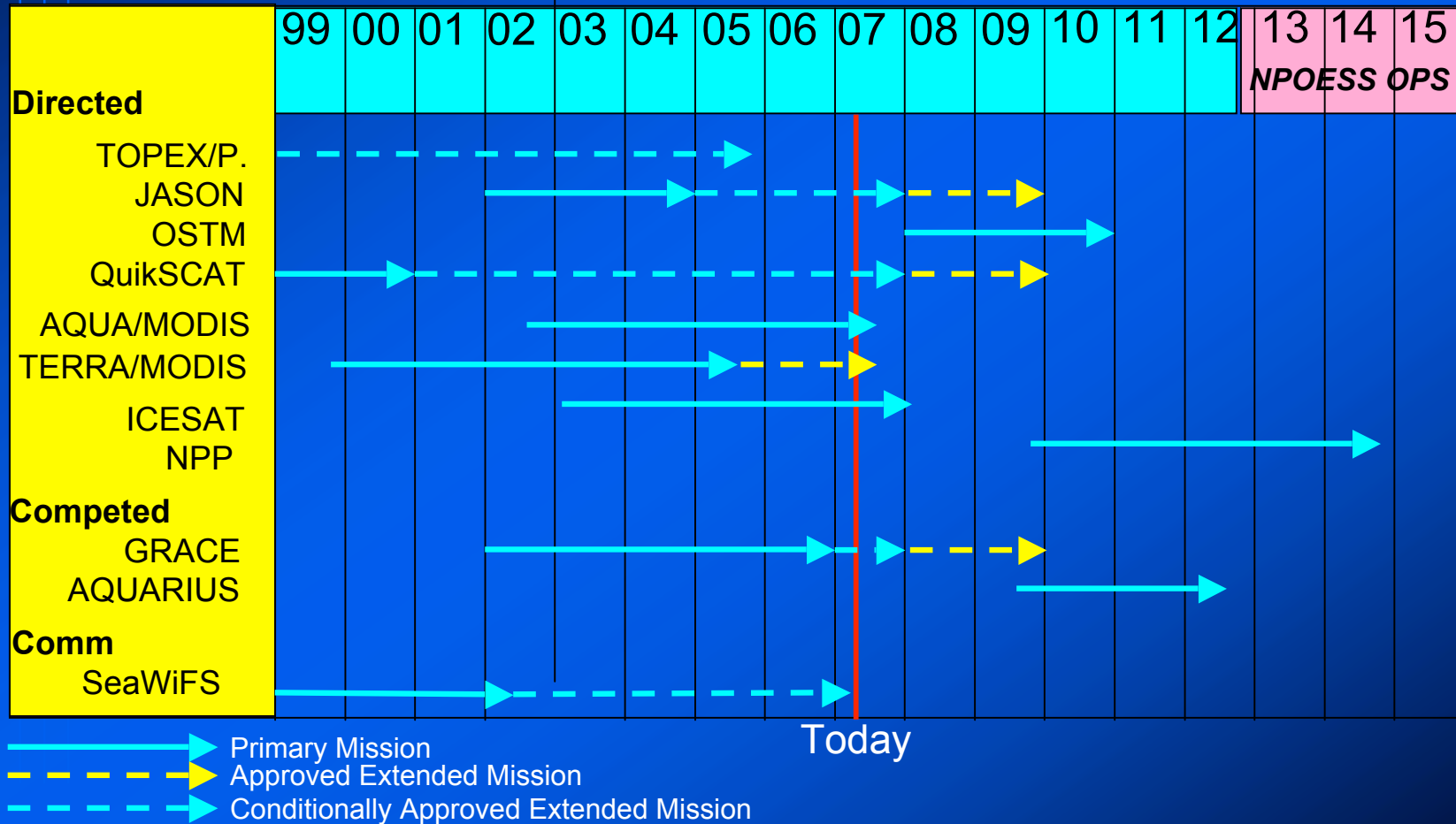
NASA's Ocean Biology and Biogeochemistry Program Challenges

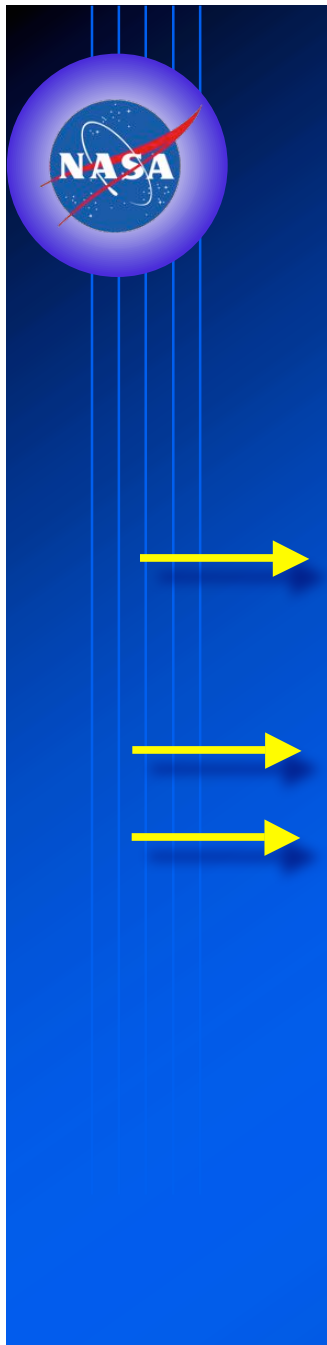
- i) shift in NASA priorities to 'pioneer the future in space exploration, scientific discovery and aeronautics research', eliminating a key phrase in previous Vision '*To understand and protect our home planet*'; to explore the universe and search for life; to inspire the next generation of explorers ... as only NASA can'
- ii) **absence of an 'Ocean Sciences' (biogeochemistry?) panel** in NRC Decadal Study, which nominally advises NASA's, NOAA's, and USGS's sat. program. Relegates ocean missions to importance to Climate, Applications, Weather, or LU Change, Eco. Dynamics and Biodiversity.
- iii) Integration of the **Congressionally-mandated NASA Science Plan** with the NRC Decadal Survey
 - NASA Authorization Act for 2005 (S.1281) - (d) SCIENCE.— (1) IN GENERAL.—The Administrator shall develop a plan to guide the science programs of NASA through 2016.
- iv) **gaps in coverage for key properties** (phytoplankton chlorophyll *a*, primary productivity) after on-orbit missions (SeaWiFS, MODIS). There are no ocean OBB missions in the queue after MODIS for NASA. NPP and NPOESS VIIRS may not provide continuity in systematic observations.



NASA Current and Approved Oceans and Ice Missions

Beyond OSTM (2008) and Aquarius (2009), there are no approved NASA oceanographic satellite missions

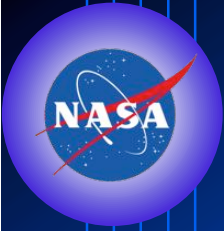




...the missions are given in Part II, and Part III provides the foundation for selection.

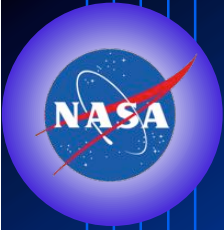
Decadal Survey Mission	Mission Description	Orbit	Instruments	Rough Cost Estimate
Timeframe 2010 – 2013, Missions listed by cost				
CLARREO (NASA portion)	Solar and Earth radiation, spectrally resolved forcing and response of the climate system	LEO, Precessing	Absolute, spectrally-resolved interferometer	\$200 M
SMAP	Soil moisture and freeze/thaw for weather and water cycle processes	LEO, SSO	L-band radar L-band radiometer	\$300 M
ICESat-II	Ice sheet height changes for climate change diagnosis	LEO, Non-SSO	Laser altimeter	\$300 M
DESDynI	Surface and ice sheet deformation for understanding natural hazards and climate; vegetation structure for ecosystem health	LEO, SSO	L-band InSAR Laser altimeter	\$700 M
Timeframe: 2013 – 2016, Missions listed by cost				
HypIRI	Land surface composition for agriculture and mineral characterization; vegetation types for ecosystem health	LEO, SSO	Hyperspectral spectrometer	\$300 M
ASCENDS	Day/night, all-latitude, all-season CO ₂ column integrals for climate emissions	LEO, SSO	Multifrequency laser	\$400 M
SWOT	Ocean, lake, and river water levels for ocean and inland water dynamics	LEO, SSO	Ka-band wide swath radar C-band radar	\$450 M
GEO-CAPE	Atmospheric gas columns for air quality forecasts; ocean color for coastal ecosystem health and climate emissions	GEO	High and low spatial resolution hyperspectral imagers	\$550 M
ACE	Aerosol and cloud profiles for climate and water cycle; ocean color for open ocean biogeochemistry	LEO, SSO	Backscatter lidar Multiangle polarimeter Doppler radar	\$800 M
Timeframe: 2016 -2020, Missions listed by cost				
LIST	Land surface topography for landslide hazards and water runoff	LEO, SSO	Laser altimeter	\$300 M
PATH	High frequency, all-weather temperature and humidity soundings for weather forecasting and SST ^a	GEO	MW array spectrometer	\$450 M
GRACE-II	High temporal resolution gravity fields for tracking large-scale water movement	LEO, SSO	Microwave or laser ranging system	\$450 M
SCLP	Snow accumulation for fresh water availability	LEO, SSO	Ku and X-band radars K and Ka-band radiometers	\$500 M
GACM	Ozone and related gases for intercontinental air quality and stratospheric ozone layer prediction	LEO, SSO	UV spectrometer IR spectrometer Microwave limb sounder	\$600 M
3D-Winds (Demo)	Tropospheric winds for weather forecasting and pollution transport	LEO, SSO	Doppler lidar	\$650 M

^a Cloud-independent, high temporal resolution, lower accuracy SST to complement, not replace, global operational

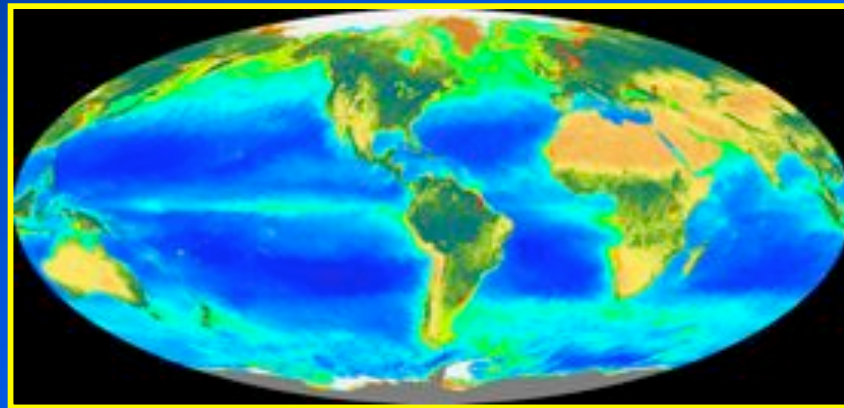


Agency, Earth Science & NRC Planning

- Legacy Science Focus Area roadmaps available, draft Research Strategy (Jan 2005) reviewed by ESSAAC, draft ten-year science plan to Congress (Dec 2006)
- Plan to implement missions that are currently in development and formulation
- Utilize SFA Legacy roadmaps to initiate mission concept studies in a preparatory process to respond to decadal survey report
- ESD Roadmap in progress to respond to the Decadal Survey
- Continue to work interagency planning and collaborative programs



Earth's Living Ocean: The Unseen World



NASA Ocean Biology and Biogeochemistry Program

Team from April 2005: Michael Behrenfeld, Heidi Dierssen, Paul DiGiacomo, Steve Lohrenz, Chuck McClain, Frank Muller-Karger, Dave Siegel, (Paula Coble)

May 2006-October 2006: Posted for Public Comment

Reviewers: Tony Freeman, Norm Nelson, Jim Yoder

March 2007: Briefed to NRC

April 2007: Negotiations with NRC for review (OSB and SSB)



Calibration and Validation Science Plan/Round Robins/Workshops



- **Ocean Optics Protocols**
 - **Uncertainties with methods**
 - **IOP Instrument Uncertainties**
 - **how PIs measure instrument performance and uncertainties**
 - **data processing**
 - **review existing protocols**
 - **HPLC Quantitation in Coastal Waters**
 - **Go beyond existing dynamic range of SH experiments (0.2-26.2 mg m⁻³)**
 - **Common AOP Data Processing Interface**
 - **Automatic interface for submitting data in common format**
 - **Vicarious Calibration Site Selection + alternatives**
 - **Revisit site selection since 1980's, BOUSSOLE, BATS, HOT**
 - **Other approaches?**
- ** PIs funded via ROSES required to participate in workshops and meetings*****
- **Workshops proposed by community members:**
 - **P. Coble on CDOM**
 - **Y. Gao on atmospheric deposition of iron to ocean**
 - **Validation for Habitats**
 - **SeaHARRE-4: Meeting week of 22 October in Denmark, open to community**



SeaBASS + Data Policy



- **NASA Guidebook for Proposers:**

<http://www.hq.nasa.gov/office/procurement/nraguidebook/>

- **The Guidebook (F.13) does state that new data obtained is non-proprietary and is in the public domain. It notes that if placing data in the public domain is a burden than NASA may fund it.**
- **Effective immediately:** urge PIs to get in compliance with the NASA data policy (data submission to SeaBASS). All data in SeaBASS are available with contact information for PI attached.



NASA Research Opportunities



- **ROSES – Research Opportunities in Space and Earth Science**
 - Omnibus solicitation with former Space Science
 - Released in February each calendar year w/rolling deadlines for NOIs, Proposal Due Dates
 - Updates to different sections in Table of Contents via Amendments by E-mail
- **Solicitations Closed, Under Review**
 - International Polar Year - \$6M/yr **[May 2007]**
 - Earth System Science Research using Data and Products from the Terra, Aqua, and ACRIMSAT Satellites- \$25M/yr **[May 2007]**
 - Ocean Biology and Biogeochemistry (Southern Ocean Carbon Program (GasEx)) – **[June 2007]**
- **ROSES 2007 - <http://nspires.nasaprs.com/> - “Solicitations” – boiler plate**
 - **Carbon Cycle Science** (~\$7-9M/yr – **6.6.2007**) w/USDA
 - Global carbon cycle modeling and analysis;
 - Regional studies that provide critical understanding of and offer to reduce major uncertainties about the global carbon cycle;
 - Studies of the carbon cycle implications of ocean acidification; and
 - Decision-support systems for carbon management
 - **Accelerating Operational Use of Research Data** – (up to \$2M/yr – **9.18.2007**) - Ecological forecasting (e.g., fisheries)
 - **Ocean Biology & Biogeochemistry w/Suborbital Science** (up to \$2M/yr – **TBD**)
 - **Ecology and Oceanography of Harmful Algal Blooms** (partner agency)



NASA Research Opportunities



- **New Investigator Program in Earth Science – (1/8 or 1/10) [31 August 2007] – mwei@nasa.gov**
 - Designed for scientists and engineers with Ph.D. degrees within the last 5 years
 - Must be US citizen or legal permanent resident (with Green card) at the time of award (immediately after selection)
 - Both Research and Education plans are required, with Research carrying approx. double the weight of Education, motivating scientists/engineers to recognize that our job does not end with publishing papers.
 - 3-year awards at \$80-120K/year
 - A source of PECASE nominations, but not the only source

- **Earth System Science Fellowship Program – Graduate Students - Annual (1/4-1/7) – Currently Under Review – [May 2007]**
 - Support to graduate students pursuing master's and/or Ph.D. degrees in disciplines addressing Earth system science and remote sensing
 - Up to 3 years of support at \$24K/year (Increase to \$30K/year anticipated in FY2008)
 - Applications due February 1 every year; announcement of selections late May; award start-date September 1
 - Foreign students, if enrolled full-time at a US institution, may apply



Ocean Research Priorities Plan



- **Ocean Research Priorities Plan - <http://ocean.ceq.gov/>**
 - Four near-term research priorities identified
 - Sensors for Marine Ecosystems – potential thoughts:
 - Begin development of new sensors to allow multi-scale observations of high priority aquatic ecological properties
 - Development of the next generation of optical and bio-optical field sensors to allow further exploitation of current satellite (or other remote sensor) data

NOPP BAA (NASA, NOAA, NSF, ONR) in development for
Summer 2007 (\$7-9M/yr) – FY08

- NASA – P. Bontempi
- NOAA – S. Murawski, P. Sandifer
- NSF – A. Isern
- ONR – J. Eckman



Role of the Community



- Design and feedback of a robust living Calibration/Validation Program & Ocean Biology and Biogeochemistry Research Advance Plan—
Workshops/reports/research/round robins
 - Collaboration among PIs – integration of efforts with selected proposals
 - Engage ORION and IOOS
 - SOLAS, IMBER, CLIVAR, NACP, OCCC (ship time, etc.)
 - BOUSSOLE, Venice Tower; ESA
- Enhancement of ocean biology processing group
 - Data product/algorithm selection and feedback; Data reprocessing, merging, assimilation, modeling – Earth System Data Records
- National and International Workshops – SOLAS, IMBER, OOI, NACP, OCCC
- Annual Ocean Color Research Team Meetings – modeling, innovative technologies, future measurements and initiatives
- NRC Decadal Survey response, workshops; plan reviews



Notices



- **EOS Recomplete**
 - Awaiting budget target, last panel complete
- **Special Session** – Ocean Sciences 2008 – new frontiers and concepts
- **Renewals**
 - 60-90 days
- **PR**
 - Copies of publications
 - Press Releases
 - Media Telecons
 - NASA Science Updates (SeaWiFS)
- **Summer**
- **Next meeting (2008): with the Carbon Cycle and Ecosystems focus area programs (Biodiversity, Land Cover/Land Use Change, Terrestrial Ecology, Ecological Forecasting, Carbon Management). Washington D.C. Area, April 2008.**
 - **2009 and out suggestions: New York City; Austin, Texas**

Thank you.