

# SOT as part of the integrated ocean climate observing system: a report from OOPC

Ed Harrison (chair, OOPC)  
and Albert Fischer (technical secretariat)



**GCOS**  
Global Climate  
Observing System



Global Ocean  
Observing System



World Climate  
Research Programme



# Ocean Observations Panel for Climate (OOPC)

- A panel of the Global Climate Observing System (**GCOS**), the Global Ocean Observing System (**GOOS**), and the World Climate Research Programme (**WCRP**); also gives advice to the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (**JCOMM**)
- Recommendations for a **global system** that provides **data and information** for climate monitoring and forecasting, assessment, and research
- including recommendations on phased implementation
- strategies for evaluation and evolution of the system and its recommendations
- supporting observing system activities through liaison and advocacy for agreed plans

# Goals of the observing system

- provide data and information products for
  - Climate monitoring and forecasting
  - Climate assessment
  - Climate research
- growing interest in understanding climate impacts, supporting decision-making in adaptation to climate change
- serve as the foundation for global operational oceanography



# OOPC Ocean Observations Panel for Climate

Scientific and technical recommendations for a **sustained global ocean observing system for climate** and operational oceanography

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## State of the tropical oceans for the week ending 09 May 2009

[key to symbols >](#)

<p>Indian Ocean dipole <a href="#">DMI map &gt;</a></p>	<p>central Pacific Niño3.4 <a href="#">map &gt;</a></p>	<p>tropical North Atlantic <a href="#">TNA map &gt;</a></p>
<p>dipole conditions: warmer in west / colder in east; tendency for westward shift in convection and precipitation</p>	<p>— normal temperatures</p>	<p>anomalously cold tropical North Atlantic conditions</p>
<p>↔ stationary over last month</p>	<p>↑ strong warming over last month</p>	<p>↔ stationary over last month</p>

The sea surface temperatures set by the dynamics of the tropical oceans interact strongly with the tropical atmosphere, affecting winds and patterns of convection and precipitation, coupling back with the ocean dynamics. Atmospheric teleconnections can also affect conditions over many parts of the globe. The **ocean climate indices** above, indicators of tropical sea surface temperature anomalies, help capture the seasonal and interannual variability of the climate system. This quick overview above of some of last week's anomalies is extracted from the [OOPC state of the ocean climate overview >](#)

Gathering the data necessary for these and other climate indices, as well as to underpin climate monitoring, forecasting, and research, is the goal of the [initial ocean observing system for climate >](#)

### About the OOPC

The Ocean Observations Panel for Climate (OOPC) is a scientific expert advisory group charged with making recommendations for a **sustained global ocean observing system for climate** in support of the goals of its sponsors. This includes recommendations for phased implementation. The Panel also aids in the development of strategies for evaluation and evolution of the system and of its recommendations, and supports global

The OOPC is sponsored by



**GCOS**

The Global Climate Observing System



The Global Ocean Observing System



The World Climate Research Programme

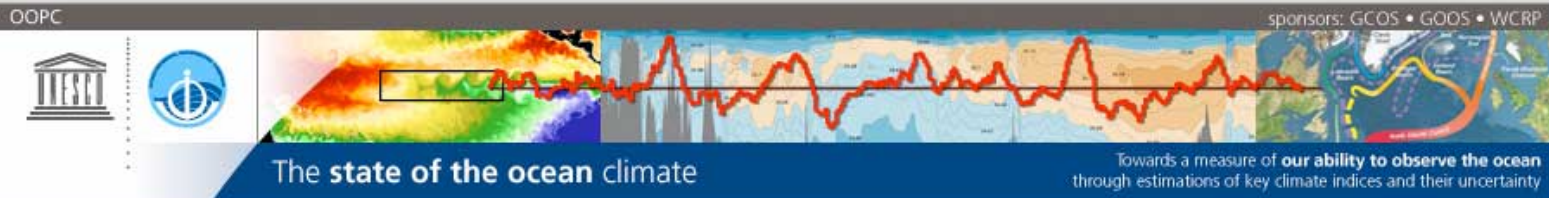
and provides advice on scientific requirements to



The Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology

The OOPC Technical Secretariat is hosted by IOC/UNESCO with financial support from NOAA

partners in building the ocean observing system for climate



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**Surface ocean indices (value for week ending 09 May 2009)**

	current value	series std	current value key »	monthly tendency key »
<b>Pacific</b>				
Niño1+2 far eastern equatorial SSTA <a href="#">map »</a>	0.71 °C	±1.22 °C		
Niño3 eastern equatorial SSTA <a href="#">map »</a>	0.23 °C	±1.00 °C		
Niño3.4 central equatorial SSTA <a href="#">map »</a>	-0.02 °C	±0.95 °C		
Niño4 west-central equatorial SSTA <a href="#">map »</a>	-0.03 °C	±0.95 °C		
<b>Atlantic</b>				
TNA north tropical SSTA <a href="#">map »</a>	-0.40 °C	±0.40 °C		
TSA south tropical SSTA <a href="#">map »</a>	0.80 °C	±0.37 °C		
NAT north equatorial SSTA <a href="#">map »</a>	-0.65 °C	±0.44 °C		
SAT south equatorial SSTA <a href="#">map »</a>	0.61 °C	±0.48 °C		
TASI north-south equatorial SST gradient <a href="#">map »</a>	-1.26 °C	±0.62 °C		
<b>Indian</b>				
WIIO western equatorial SSTA <a href="#">map »</a>	0.63 °C	±0.36 °C		
SEIO southeastern equatorial SSTA <a href="#">map »</a>	0.10 °C	±0.43 °C		
DMI west-east equatorial SST gradient <a href="#">map »</a>	0.54 °C	±0.52 °C		
SWIO south western SSTA <a href="#">map »</a>	-0.34 °C	±0.45 °C		

see also the [OOPC main page](#) for an alternate presentation of the state of the tropical oceans.





sponsors: GCOS • GOOS • WCRP

# The state of the ocean climate

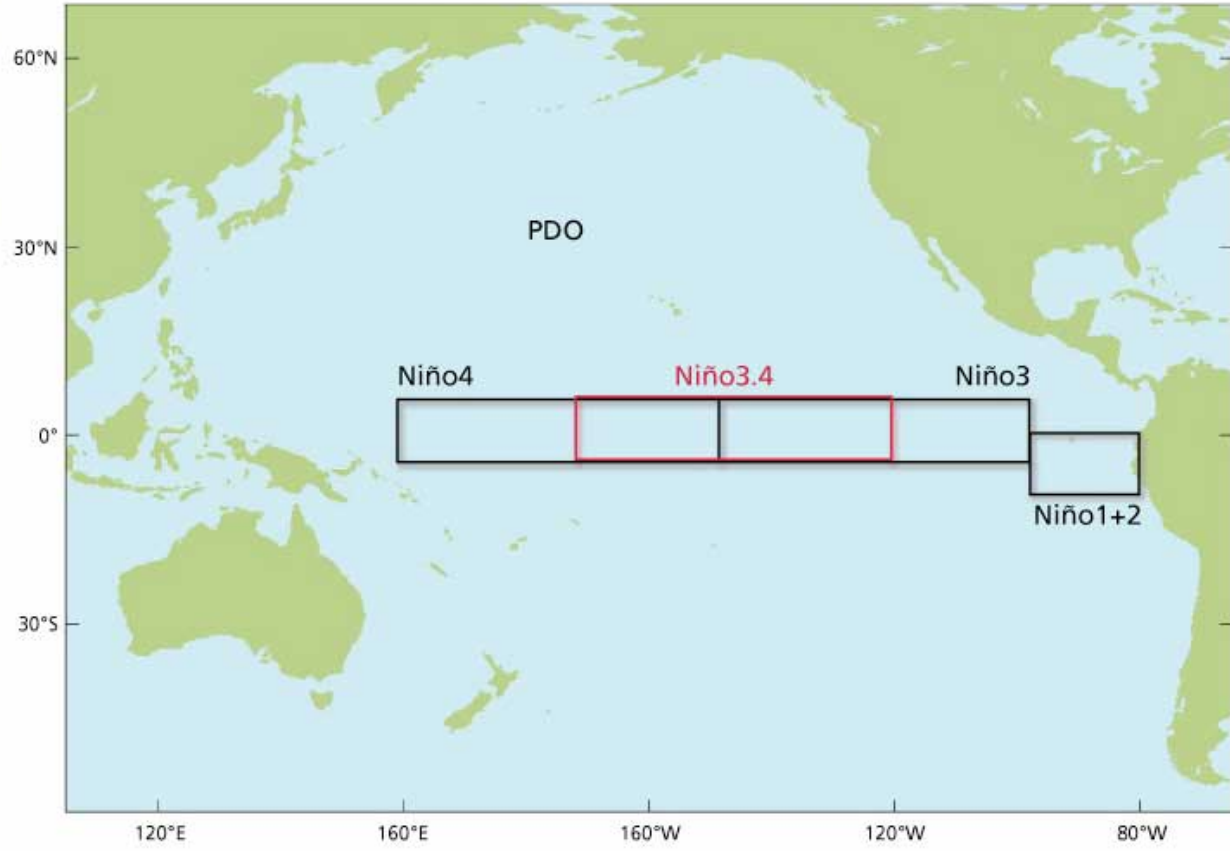
Towards a measure of our ability to observe the ocean through estimations of key climate indices and their uncertainty

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**Pacific** | Atlantic | Indian | Global mean sea level

Niño1+2 | Niño3 | Niño3.4 | Niño4



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# The state of the ocean climate

Towards a measure of our ability to observe the ocean through estimations of key climate indices and their uncertainty

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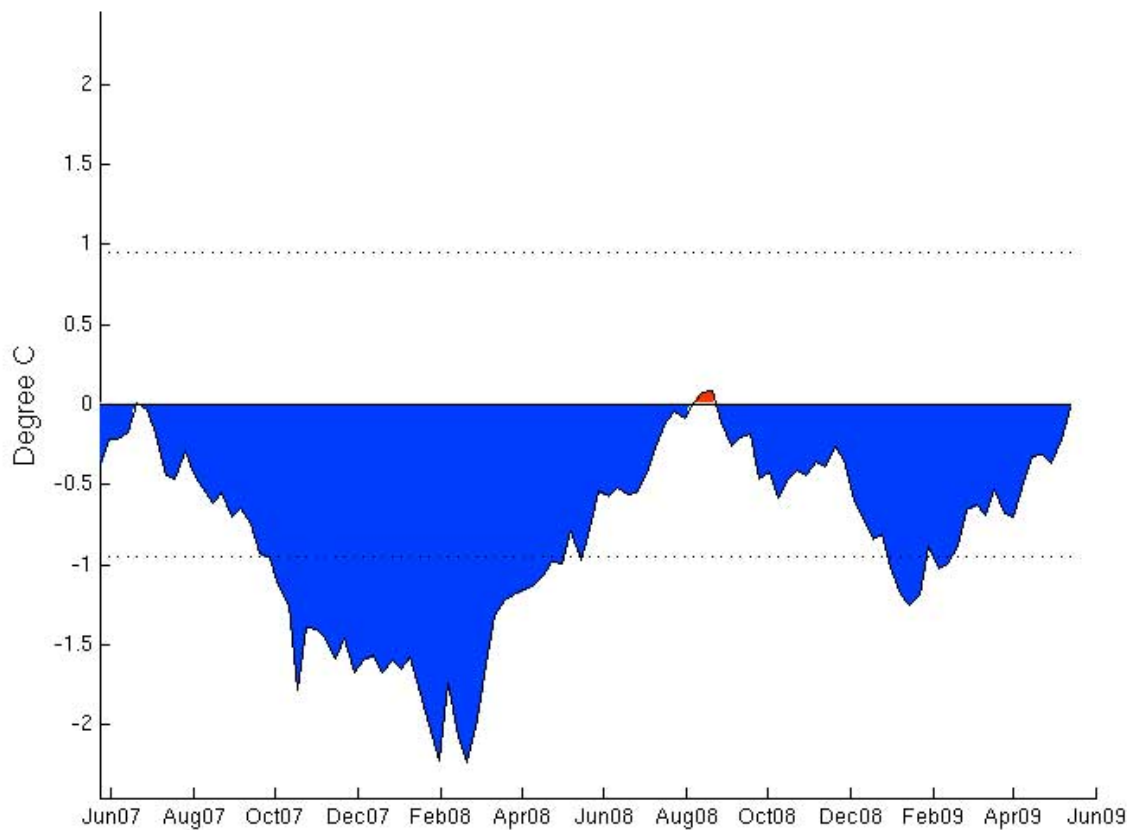


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[Pacific](#) | [Atlantic](#) | [Indian](#)

[Niño1+2](#) | [Niño3](#) | **[Niño3.4](#)** | [Niño4](#)

[Last 2 years](#) | [Full series](#)



# Climate indices based on SOT data

- VOS/SOOP data are part of the satellite SST calibration and quality control
- But no direct indices related to SOT data
- Some possibilities
  - Indonesian Throughflow index from fast-repeat XBT line?
  - estimate of surface fluxes in areas of high air-sea interaction?
- Would like to add some climate indices with societal relevance with the aid of the SOT

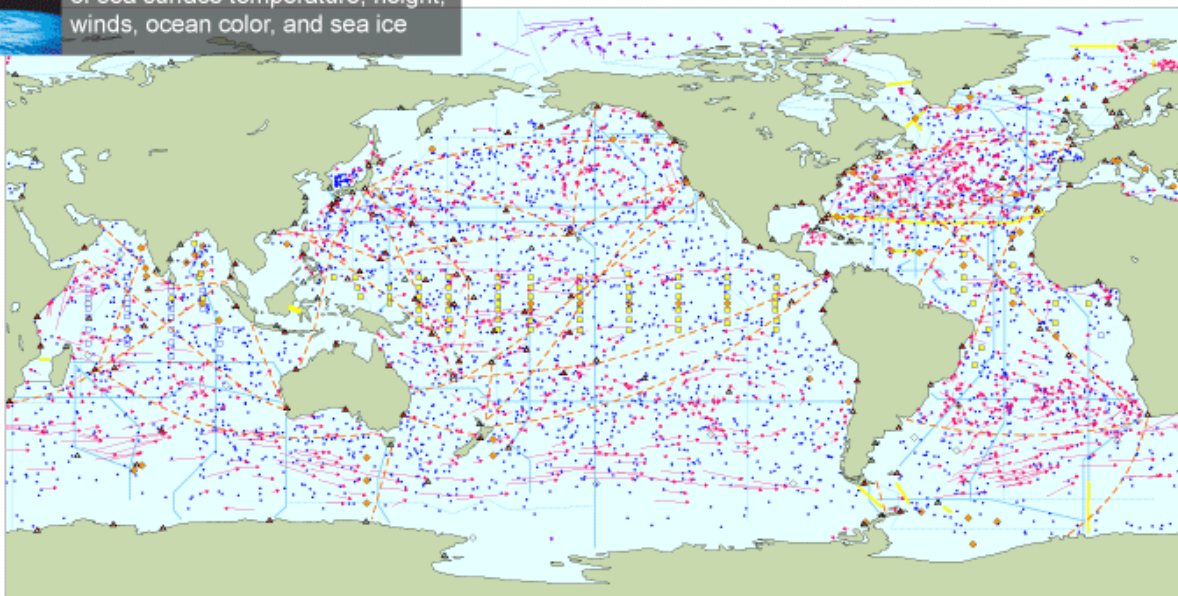








# The observing system for climate

continuous satellite measurements of sea surface temperature, height, winds, ocean color, and sea ice

Total *in situ* networks **61%**

May 2009



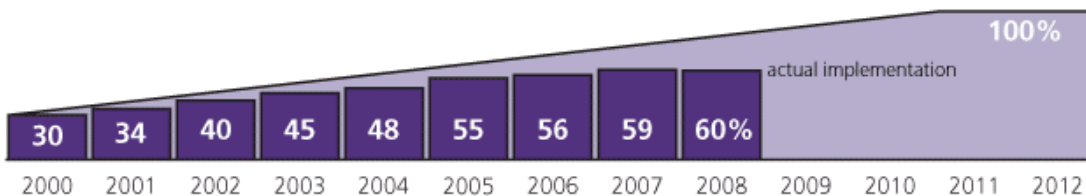
- 
**87%** **Surface measurements from volunteer ships (VOS)**  
 250 ships in VOSclim pilot project
- 
**100%** **Global drifting surface buoy array**  
 5° resolution array: 1250 floats  
 ice buoys
- 
**66%** **Tide gauge network (GCOS subset of GLOSS core network)**  
 170 real-time reporting gauges
- 
**81%** **XBT sub-surface temperature section network**  
 51 lines occupied
- 
**100%** **Argo profiling float network**  
 3° resolution array: 3000 floats
- 
**59%** **Repeat hydrography and carbon inventory**  
 Full ocean survey in 10 years

**Transport monitoring** **24%**  
 29 sites

**Global time series network** **54%**  
 58 moorings planned

**Global tropical moored buoy network** **79%**  
 119 moorings planned

Representative milestones



original goal for full implementation by 2010

**System % of initial goals**

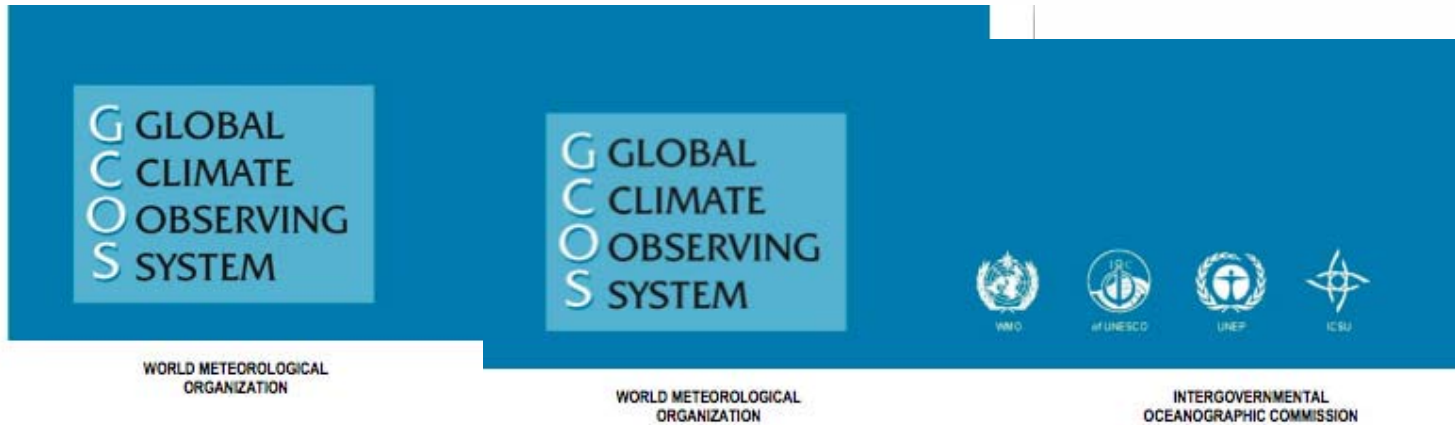
# How is the system coordinated between networks?

- Technical coordination via the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) - Observations Coordination Group
  - status of networks
  - standards for metadata, telecommunications
  - common issues
- JCOMM in situ Observing Platform Support Centre (JCOMMOPS)
  - technical coordination for surface drifters, ship observations (met and XBT), Argo floats, OceanSITES reference moored stations
- Rely on the time donated by you to build coordination between implementers within and across observing networks

# Who asks for information on the climate system, and how does this help the SOT?

- GOOS, WMO Integrated Observing System, IOC and WMO
- UN Framework Convention on Climate Change (UNFCCC)
  - reports on the adequacy of the system via the Global Climate Observing System (GCOS)
  - implementation plan
  - status of implementation
- Access to higher levels of national representation
  - explain importance of ocean observations including VOS and SOOP observations
  - track evolution of entire system
  - political awareness and hopefully better funding of the observing networks
  - generate political pressure for free and open data exchange

# Recommendations



September 2006

**Implementati  
Global Observing  
in Support of**

**SYSTEMATIC OBSERVATION REQUIREMENTS FOR  
SATELLITE-BASED PRODUCTS FOR CLIMATE**

*Executiv*

Supplemental details to the satellite-based component of the  
"Implementation Plan for the Global Observing System for Climate  
in Support of the UNFCCC"

Octol

September 2006

GCOS

GCOS – 107

# Particular issues for VOS

- Making **widely available recommendations** for ship-borne sensors and **best practices** for their installation, maintenance and use would, over time, increase the homogeneity and accuracy of VOS based observations.
- **Outreach to the global shipping community** in all available forums, to argue the importance of their observations to the historical climate record and explaining why this is so important in a changing environment, may be a way to generate renewed commercial participation.
- Continued engagement with the **Meta-T real time metadata project** is important for a successful outcome of that project.
- Continued efforts to seek **cost reductions for data transmission** and to see solutions implemented are desirable.

# Particular issues for SOOP

- Continued **collaboration** with the Argo and Surface Drifter programs to facilitate **deployments** where needed is important.
- Getting all XBT profile **data transmitted in near real time** should remain a goal, and actions to achieve this identified.
- **Coordination with the global repeat hydrographic survey program**, to ensure availability of ongoing information about XBT fall-rate (and other uncertainty sources) is critical for the climate utility of the XBT program.
- **Development of some data products** by the XBT program would raise its visibility. The OOPC state-of-the-ocean website ([ioc3.unesco.org/oopc/](http://ioc3.unesco.org/oopc/)) is one place that could display them.
- The CLIVAR/GOOS Indian Ocean Panel is developing an effort to maintain a **bibliography** of papers published with XBT line data in the Indian Ocean. Working with this group, and extending this effort to the other basins would likewise raise the visibility of the program.
- Getting a task group together to develop a plan for a much **wider capability for underway measurements from the SOOP ships** would be very desirable. This group would address issues of sensors, standards, best practices and water and power and space needs within the ship's laboratory space for pCO<sub>2</sub>, salinity, and each of the ecosystem and biogeochemical variables for which sensors get developed.

- **Vision**

- Strengthen and enhance the international framework under GCOS, GOOS, WCRP, IGBP and other international programmes for **sustained world ocean observing and information systems supporting the needs of society** about ocean weather, climate, ecosystems, carbon and chemistry

- **Goals for the conference and its follow-up**

- ensure **sustainability and further development** of the present system and to realize the full extent of the benefits across all stakeholders and for all participating nations
- **extending the present system** to include comprehensive observation, analysis and forecasting of the biogeochemical state of the ocean and the status of marine ecosystems

# OceanObs'09: built on community input

- SOT-related Community White Papers on:
  - SOOP
  - VOS,
  - SAMOS,
  - Marine Climatology,
  - climate record of SST,
  - surface fluxes,
  - Data management,
  - JCOMMOPS
- Your review and input to these Community White Papers
- Public review page:  
**[www.oceanobs09.net/cwp/review/](http://www.oceanobs09.net/cwp/review/)**