

Sixth IOC/WESTPAC International Scientific Symposium Challenges for Marine Science in the Western Pacific 19-23 April 2004, Hangzhou, China



WESTPAC : Sub-Commission of IOC

~20 member countries, program office in Bangkok

Sci. Symposium

Sub-Commission

6th Hangzhou, China (2004)
5th Seoul, Korea (2001)
4th Okinawa, Japan (1998)
3rd Bali, Indonesia (1995)

2002 Fremantle
1999 Pusan
1996 Tokyo

Theme 3:

Systematic Observations and Operational Systems and Applications

**Session III: Ocean, Coastal and Climate Models, With Particular
Emphasis on Multi-Disciplinary Approaches**

Chair: Dr. Neville Smith

Co-Chair: Dr. Chang-Shik Kim

14:00-14:20 (Invited) Ocean Prediction for the South China Sea (Tentative)

WANG Dongxiao, LED, South China Sea Institute of Oceanology,
Chinese Academy of Sciences

14:20-14:40 (Invited) Next Steps for the Ocean Observing System for Climate

Yutaka Michida and Prof Ed Harrison, OOPC Panel

14:40-15:00 (Invited) Data Assimilation with Argo and Altimetry

ZHU Jiang, Chinese Academy of Sciences

15:00-15:20 (Invited) Numerical Simulation of Hydrodynamics and Water Property in the Yellow Sea

Chang S. Kim, Hak Soo Lim and Jong Joo Youn, KORDI

15:20-15:40 Coffee Break

15:40-16:00 Study on New International State Equation of Seawater

CHEN Huaqiu and Yang Mei Li, National Marine Standard and Metrology
Center

16:00-16:20 Three Dimensional Analysis of Temperature and Salinity in the Equatorial Pacific Using A 3DVAR-Coupled EOF Decomposition Method

Masafumi Kamachi, Yosuke Fujii, Shiro Ishizaki, and Tamaki Yasuda
Met. Res. Inst., Japan

Theme 3 Session III contd.

- **Michida:** Report on status of observing systems for climate. He notes SP temperature still undersampled. 1/2 of world ocean @ 1100M never sampled. Japan project SAGE shows importance of repeat hydrography. The impact of TAO, Argo and VOS being revealed. Argo reaching target but estimated that in situ obs are now at 50% needed level. Important to continue satellite obs. and to develop analysis capability.

Michida : Report on status of observation systems for climate. He notes subsurface temperature still undersampled 1/2 of world ocean @1100m never sampled. Japan project SAGE shows importance of repeat hydrography. The impact of TAO/TRITON, Argo and VOS being revealed. Argo reaching target, but estimated that in situ observations are now at 50 % needed level. Important to continue satellite observations and to develop analysis capability.

NEXT STEPS :

Ocean Climate Obs. System

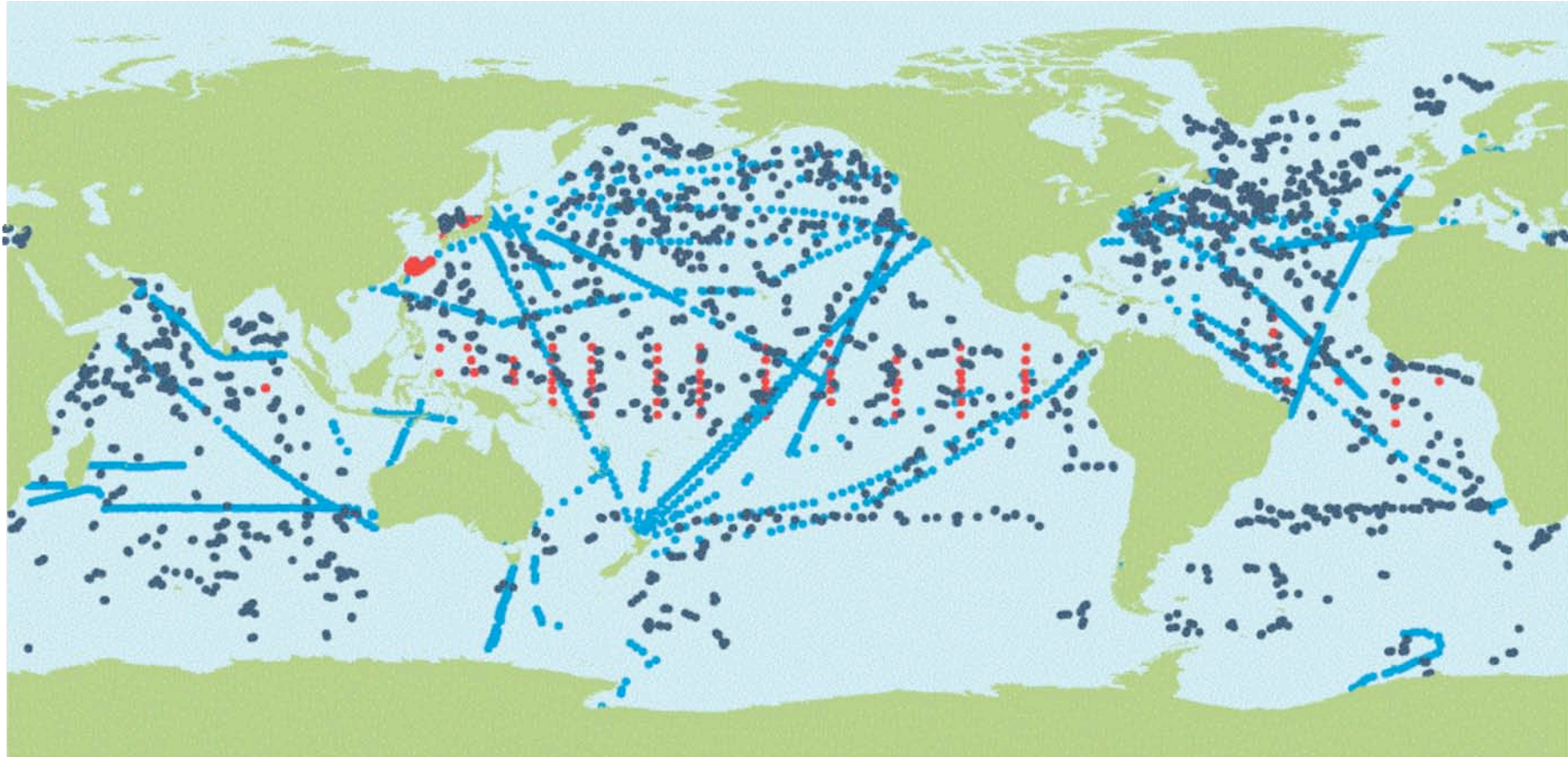
- **Implement Initial:**
 - Ocean Surface Network**
 - Ocean Subsurface Network**
- **Improve Ocean Data System**
- **Enhance Ocean Climate Analysis & Advocate for Reanalysis**
- **Strong linkage with climate research community for R&D, observations, evaluation, evolution & new science**

“Next Steps” Obs.

- **Continue key satellites:** SST, altimetry, color, wind vectors
- **Global in situ:** (overall **~50% now**)
 - 1250 drifters; 86 ref. tide gauges; 200+ VOSCLim ships; 29 moored reference sites; VOS pCO₂; 115 tropical moorings
 - 3000 Argo; repeat hydro & carbon surveys; 41 XBT lines; 29 moored sites

SUBSURFACE TEMPERATURE NETWORK, Dec 2003

(ex Repeat hydro/carbon sections)



Sub-surface Temperature profiles, December 2003 (GTS)

● Buoys (mainly moorings)

● XBTs

● Floats

GLOBAL COVERAGE LACKING, esp in S. HEM Need: ~24 more ref. sites;

~10,000 more XBTs/yr; ~30 more tropical moorings; ~2000 more Argo

The next stage of oceanography is to have

Systematic and sustained knowledge of the state of our ocean and

The useful information that follows from it.

NEEDED:

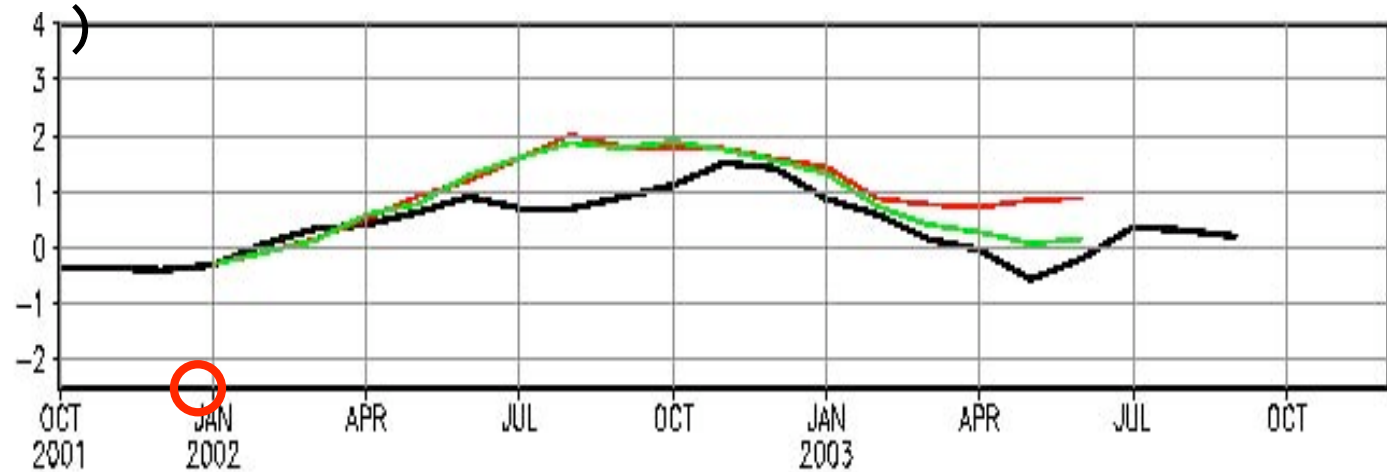
****~Doubling of our present observing efforts,***

****Continuation of key satellite missions and***

****Developing ongoing analysis capability***

Full participation by WESTPAC community (operational, scientific) is essential to establish required observation networks.

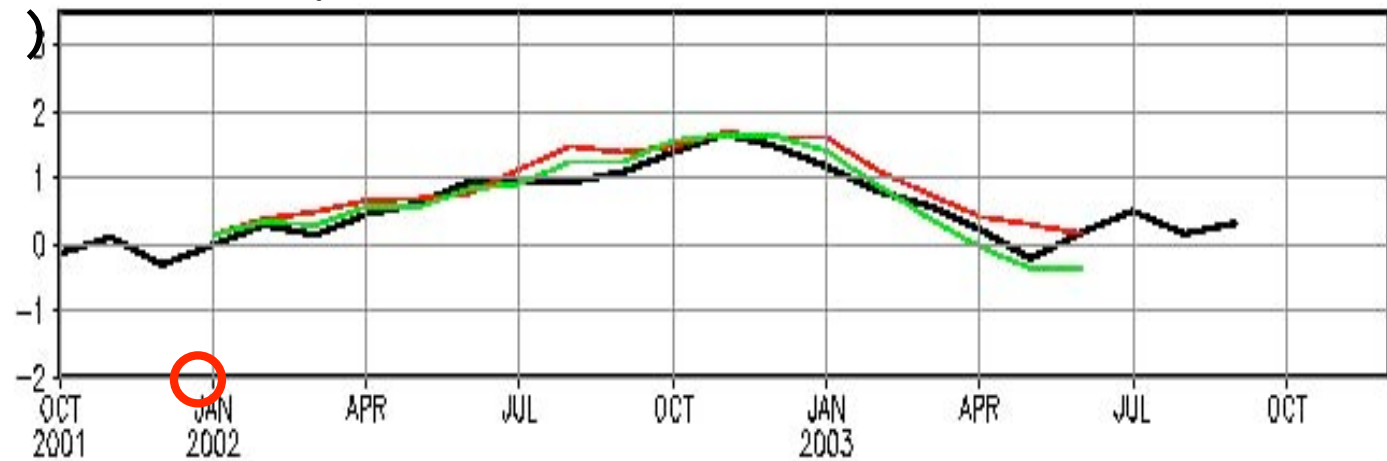
SST Anomaly in the area of NINO3 (150W-90W, 5S-5N)



Red : with Argo

Green : without Argo

SST Anomaly in the area of NINO3.4 (170W-120W, 5S-5N)

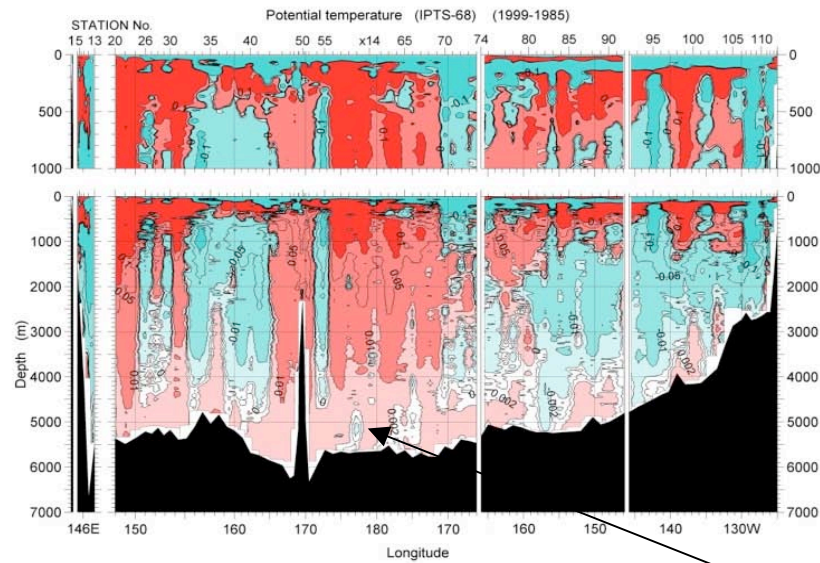


(El Nino Forecasting Center, JPN Met. Agency)

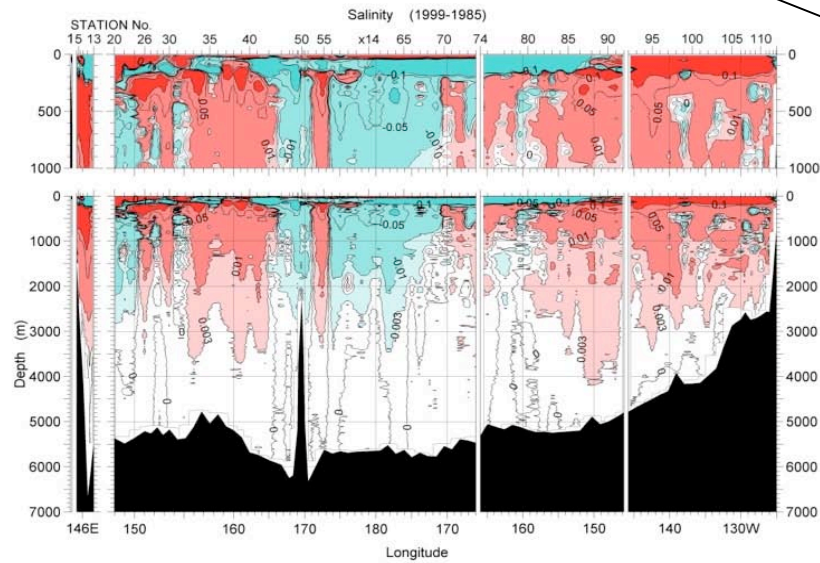
ALT and TAO/TRITON are essential, XBTs are still effective.

repeated section P1(47N) 1999-1985

Temp.



SAL



Warming in the bottom layer

Fukasawa *et al.* (2004)

R/V Mirai : 3-years cruise plan (2005-2007)

revisit to P10, P3 incl.

R/V Varuna Jaya, BPPT, Indonesia



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