

# Operational use of newly analyzed historical SST data for Climate monitoring (COBE-SST) at Japan Meteorological Agency

presented by Takashi Yoshida Ikuo Yoshikawa, Shoji Hirahara, Kazuyoshi Fukuda\*, Takanori Mastumoto, Masayoshi Ishii\*\* and Tadashi Ando  
 Japan Meteorological Agency, \*National Personnel Authority of Japan, \*\*Japan Agency for Marine-Earth Science and Technology

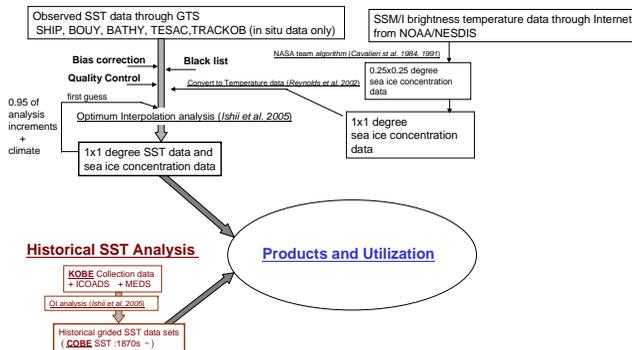
## What is COBE-SST ?

Japan Meteorological Agency (JMA) has prepared a newly analyzed historical sea surface temperature (SST) data set, which will be operationally updated and utilized for climate monitoring from March 2006. This new SST data set is a part of the gridded data sets : 'Centennial in-situ Observation-Based Estimates of the variability of SSTs and marine meteorological variables (COBE)'. The COBE-SST data set is analyzed globally with optimum interpolation technique with longitude and latitude resolutions of 1 x 1 degree using historical data sets : ICOADS and KOBE Collection. General characteristics of the data sets are reported in Ishii et al. (2005). The COBE-SST data set is already used as an ocean boundary condition of an atmospheric numerical model in the Japanese Re-analysis Project (JRA25) which is now under execution and will be completed until the end of 2005 by JMA. This reanalyzed data will also updated operationally as a part of JMA Climate Data Assimilation System (JCDAS) for the atmosphere.

## Operational analysis of the COBE-SST

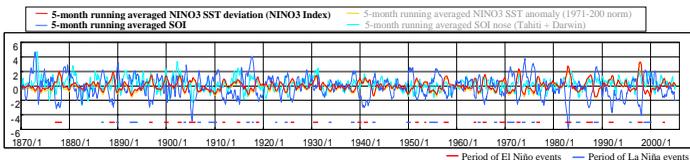
Operationally performed daily analyses are utilized together with historical SST analysis (COBE-SST) for climate monitoring and an input of the Ocean Data Assimilation System and Atmosphere Climate Data Assimilation System in JMA.

### Operational daily Analysis

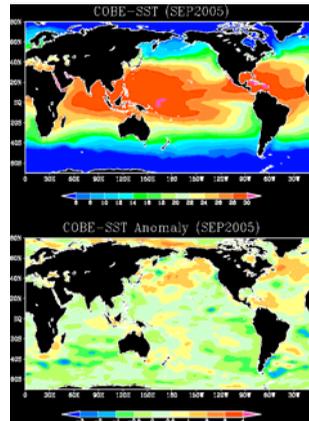


## Time series of NINO3 SST Index and Southern Oscillation Index (SOI: fig. 1)

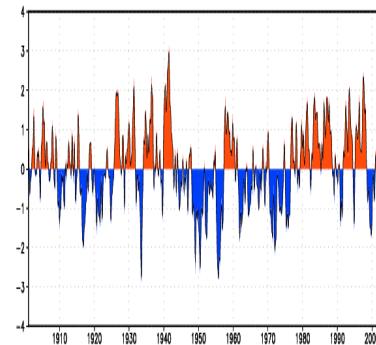
The time series of 5-month running averaged NINO3 Index (red line) and SOI (blue line) seem well correlated. The frequency of El Niño and La Niña occurrences (see red and blue lines in the bottom) seems to change in decadal time scale.



## Monthly mean SST and anomaly in September 2005 (fig. 2)

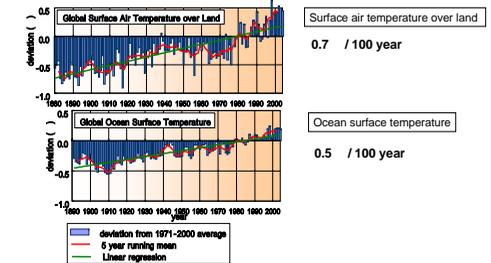


## Pacific Decadal Oscillation Index based on COBE-SST (fig. 3)



## Monitoring and Detection of Global Warming (fig. 6)

Surface air temperatures over Land have been monitored with NCDC/GHCN data and CLIMAT reports through GTS. Global ocean surface temperature is given by COBE-SST. Considering that air temperatures over ocean are nearly equal to ocean surface temperatures in averaging over certain areas and periods, global averaged surface temperature will be estimated by blending the surface air temperature over land and ocean surface temperature (COBE-SST) at the beginning of operational use for COBE-SST.



## Products and Utilization of COBE-SST

### For the Real time monitoring :

- El Niño/ La Niña monitoring (monthly El Niño Outlook and Diagnosis : figure 1, 2)
- Monitoring decadal change in the global ocean, such as Pacific Decadal Oscillation (PDO: figure 3)
- Monitoring global SST warming and utilization for detection of global warming with land temperature analysis data (figure 6, 7, table 1).

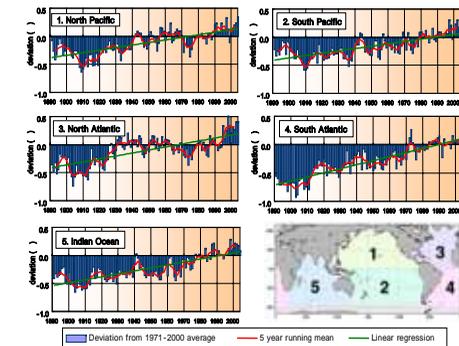
### For the Ocean model:

- Input of the Ocean Data Assimilation System (ODAS, 1984 ~)
- Monitoring El Niño / La Niña evolutions ( figure 4)
- Initial conditions of the ocean for El Niño prediction model (CGCM : figure 5)

### For the Atmosphere model :

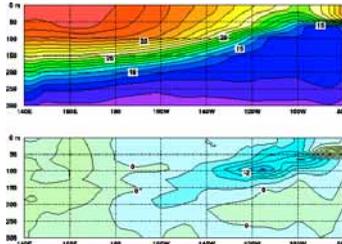
- SST boundary condition for Japanese 25-year Reanalysis project (JRA25, 1979 ~)
- and the JMA Climate Data Assimilation System (JCDAS, 2006.3 ~).
- Initial conditions for seasonal climate prediction model (in planning)

## Monitoring SST trend in each ocean (fig. 7)



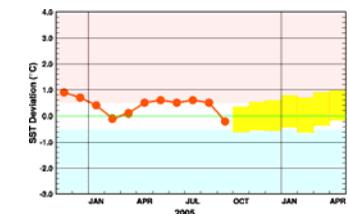
## El Niño La Niña monitoring (fig.4)

Depth-longitude cross sections of September 2005 monthly mean temperature and anomalies of along the equator in the Pacific Ocean by ODAS. Base period for normal is 1987-2004.



## Outlook of the NINO3 SST Index by the El Niño forecast model (fig. 5)

This figure indicates a time series of the monthly sea surface temperature (SST) deviation for NINO3. Thick lines with closed circles show the observed SST deviation and boxes show the predicted one for the next six months by the El Niño forecast model. Each box denotes the range where the SST deviation will be included with the probability of 70%.



## SST warming trend in each ocean (table 1)

Area	Ocean areas	Trend (°C / 100 year)
1.	North Pacific Ocean	+ 0.4
2.	South Pacific Ocean	+ 0.4
3.	North Atlantic Ocean	+ 0.5
4.	South Atlantic Ocean	+ 0.7
5.	Indian Ocean	+ 0.5
x.	Global Ocean (all ocean grid)	+ 0.5