Seven Years of TOPEX/Poseidon Observation of the Global Ocean Dynamics

Lee-Lueng Fu

Jet Propulsion Laboratory
California Institute of Technology

33rd COSPAR Scientific Assembly
Poland, Warsaw
July 16-23, 2000

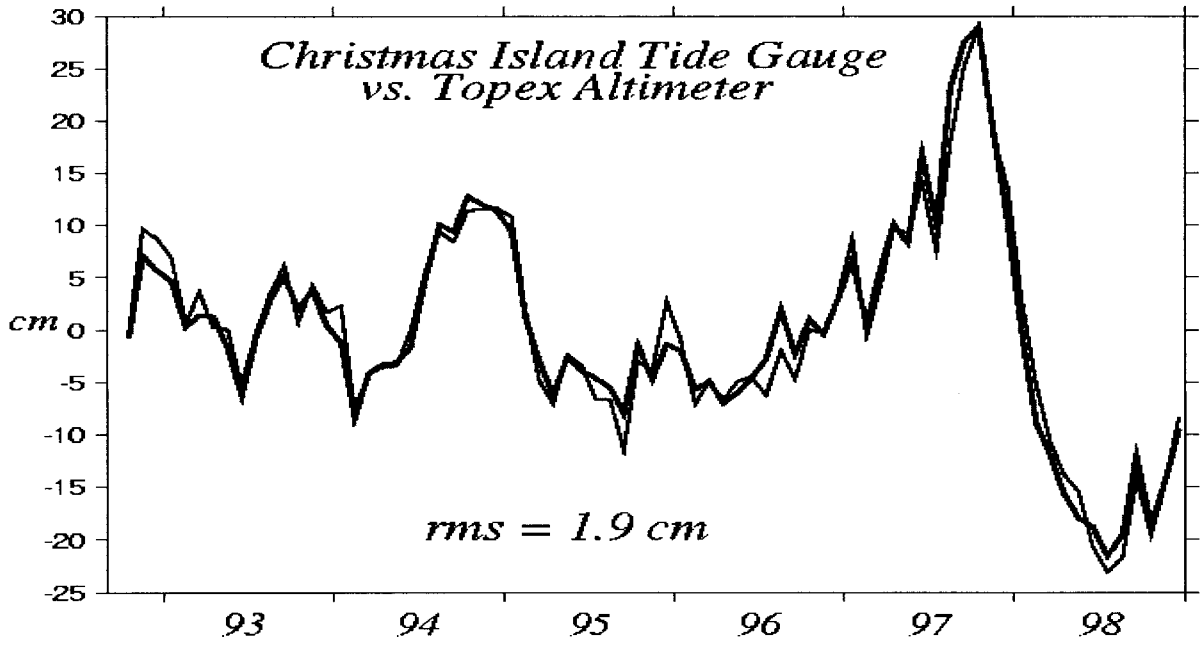
- **Longest continuous data record from radar altimetry.**

- **Unprecedented measurement accuracy.**

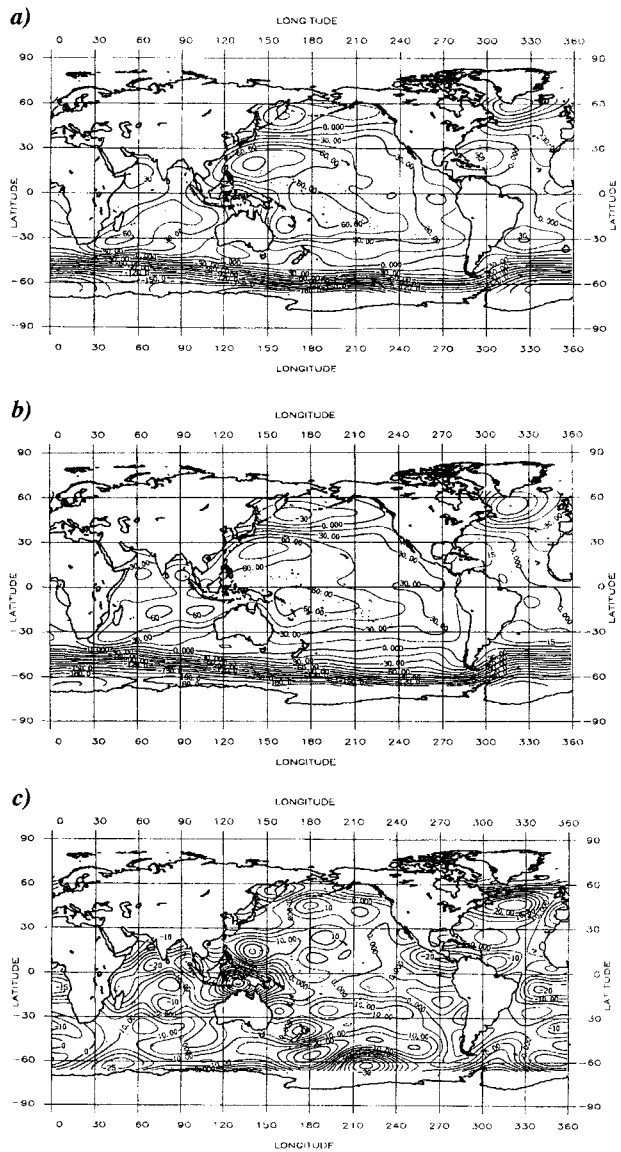
TOPEX/POSEIDON Measurement Accuracies
(one sigma values in cm)

	TOPEX	POSEIDON
Altimeter		
Altimeter noise(1)	1.7	2.0
EM bias	2.0	2.0
Skewness	1.2	1.2
Ionosphere	0.5(2)	1.7(3)
Dry troposphere	0.7	0.7
Wet troposphere	1.1	1.1
Total Altimeter Range(4)	3.2	3.7
Precision Orbit Determination		
Radial orbit height(5)	2.8	2.8
Sea Surface Height		
Single-pass sea surface height	4.3	4.6

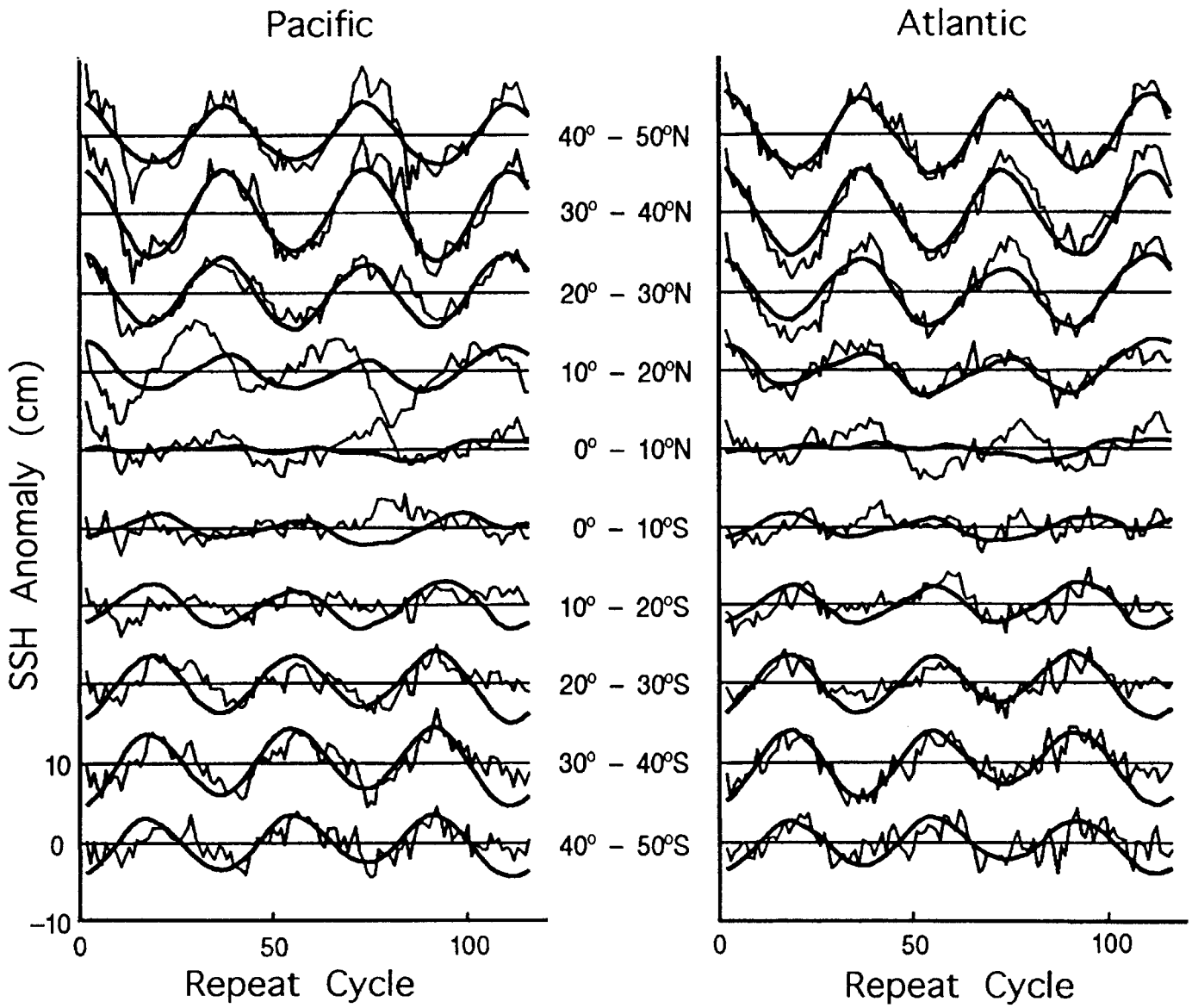
- **After spatial and temporal smoothing (1° x 4° x monthly), the measurement errors reduced to 2 cm.**



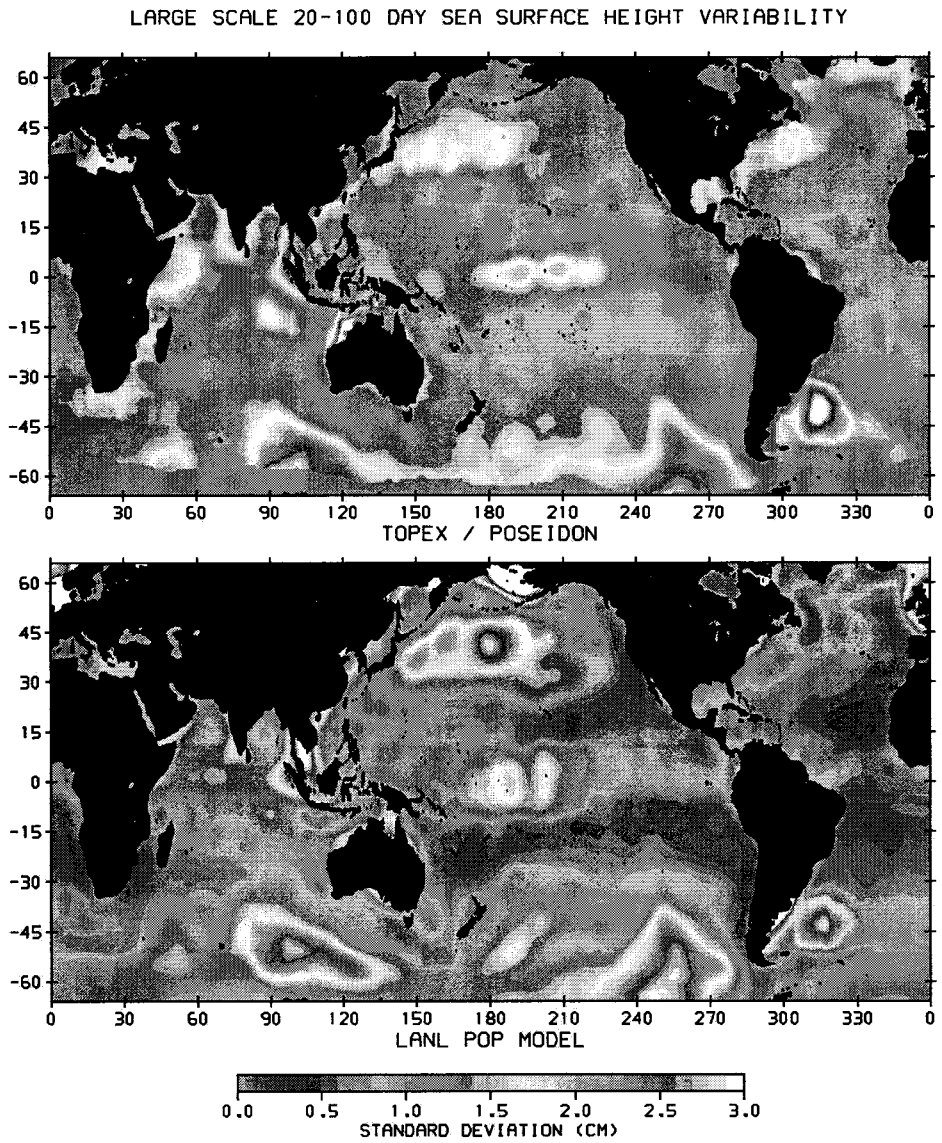
• Determination of Global Ocean General Circulation



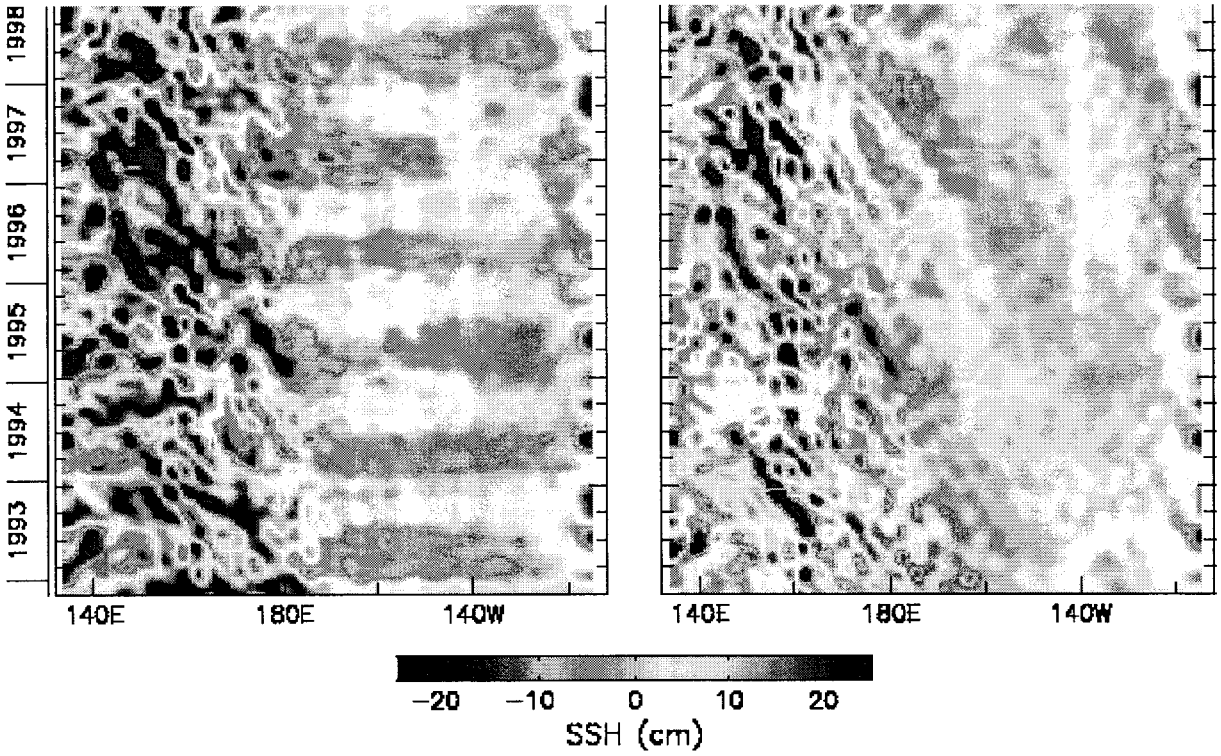
- **Determination of global ocean annual cycles**



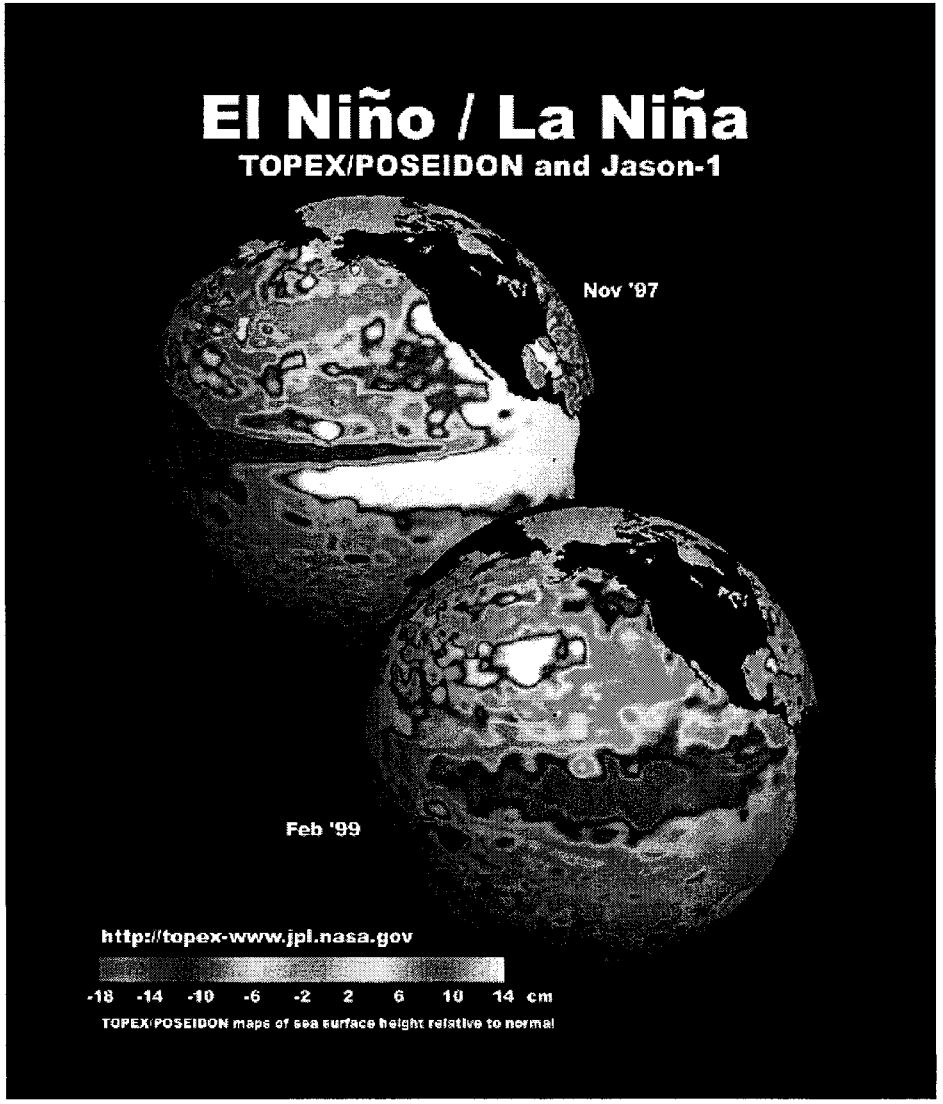
• Discovery of Global Intraseasonal Variability



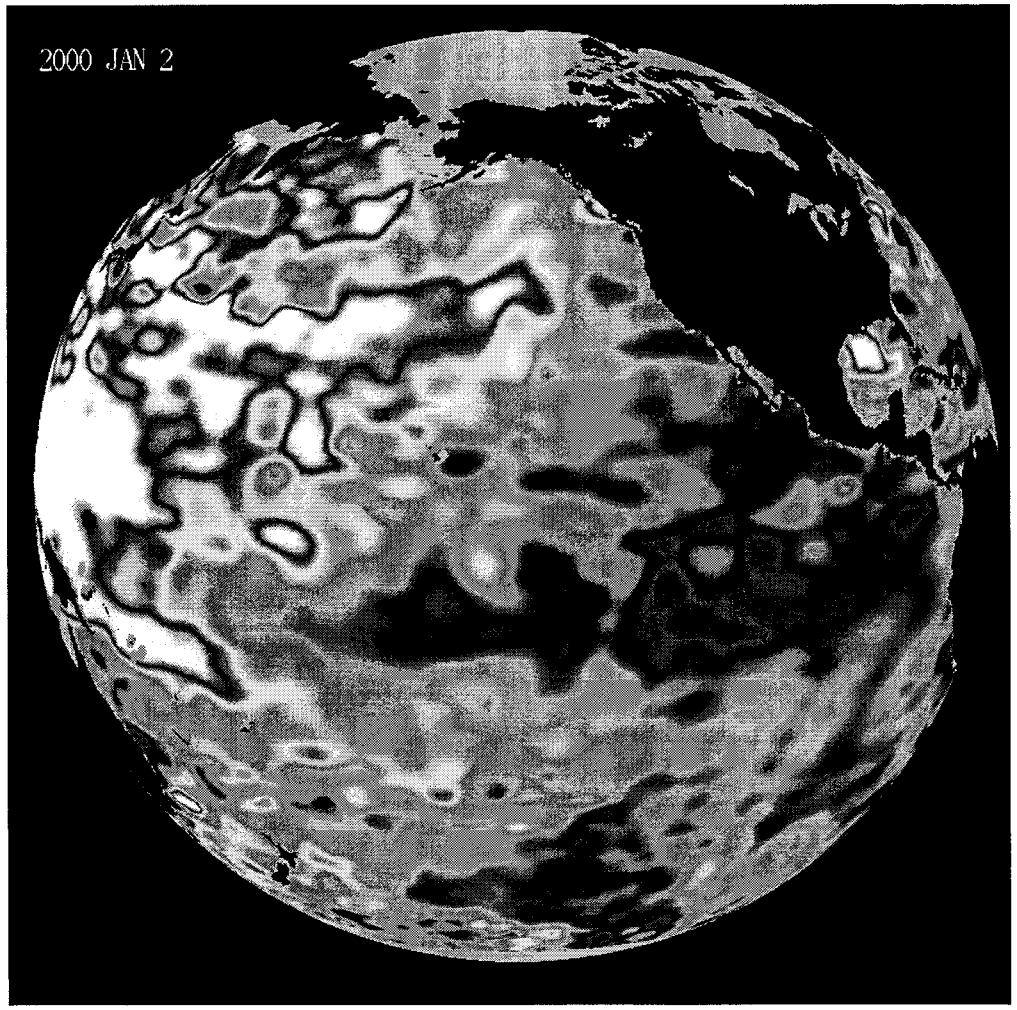
- **Discovery of fast phase speeds of Rossby waves**



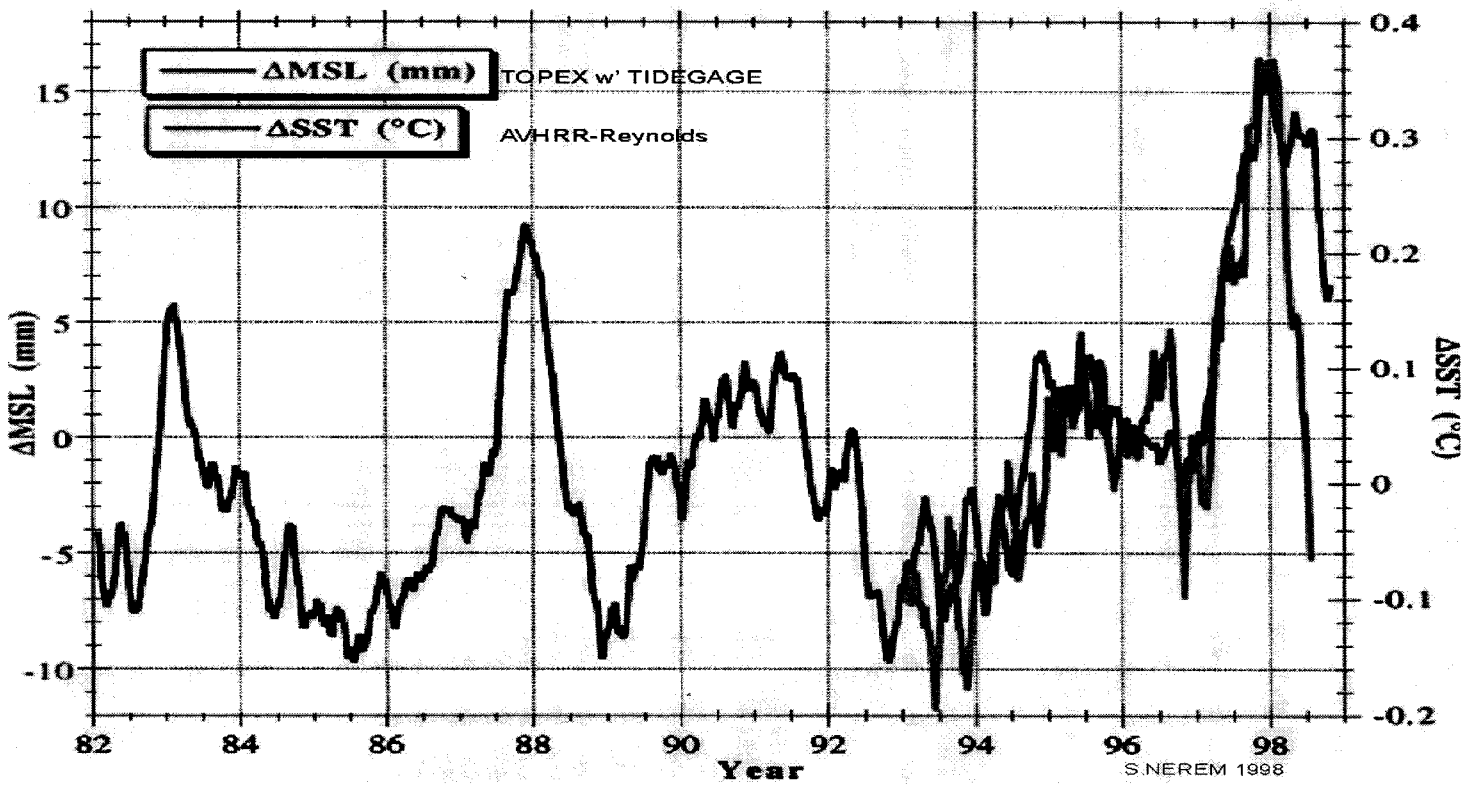
- **Monitor El Niño and La Niña**



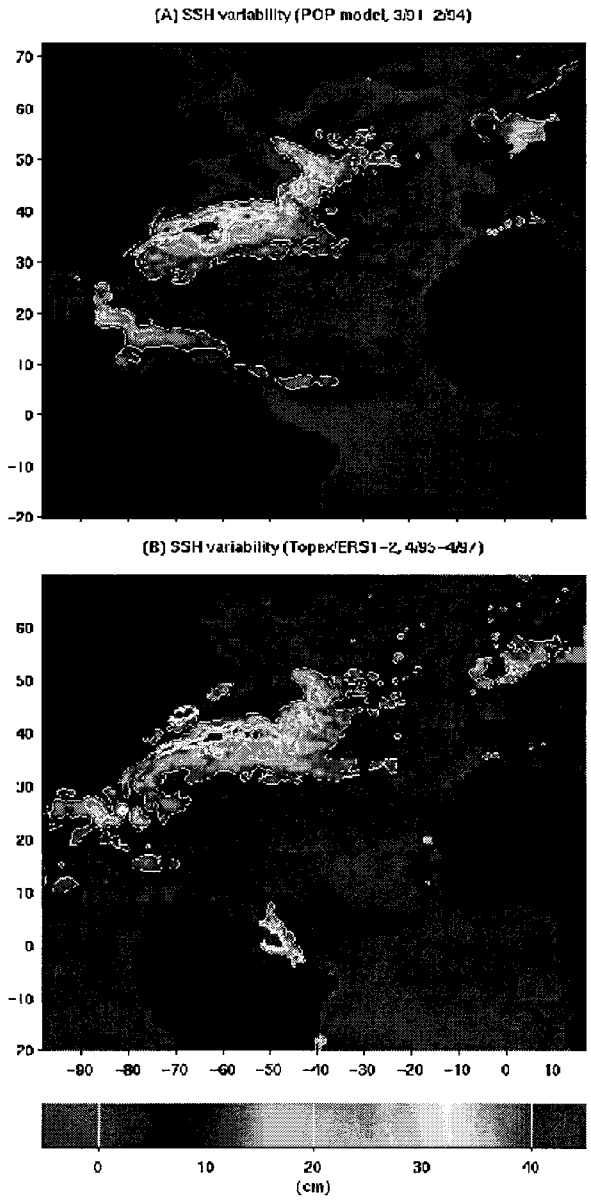
- **Detection of the emerging Pacific Dacadal Oscillation**



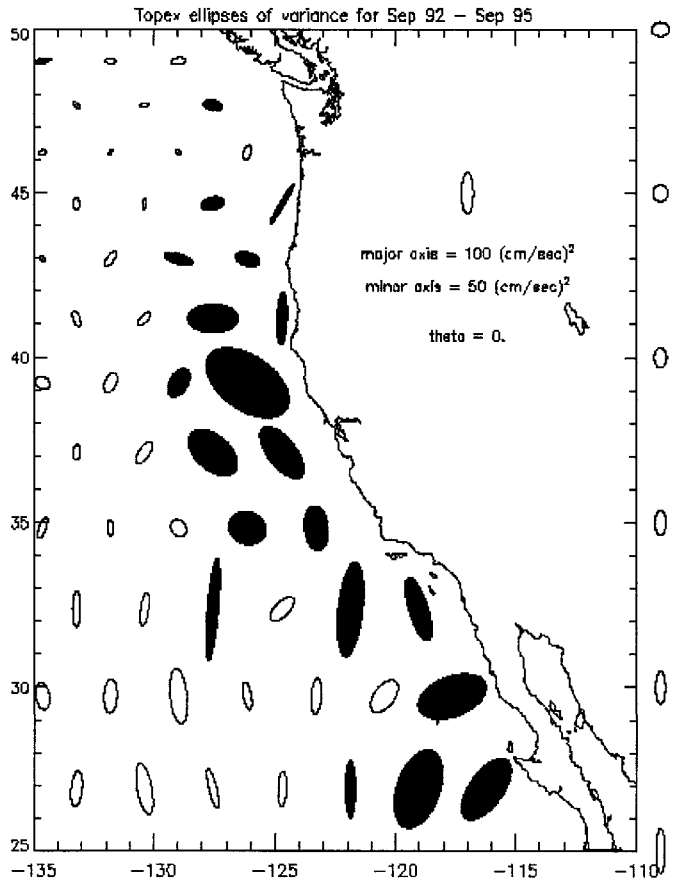
- **Monitor Global Sea Level Rise**



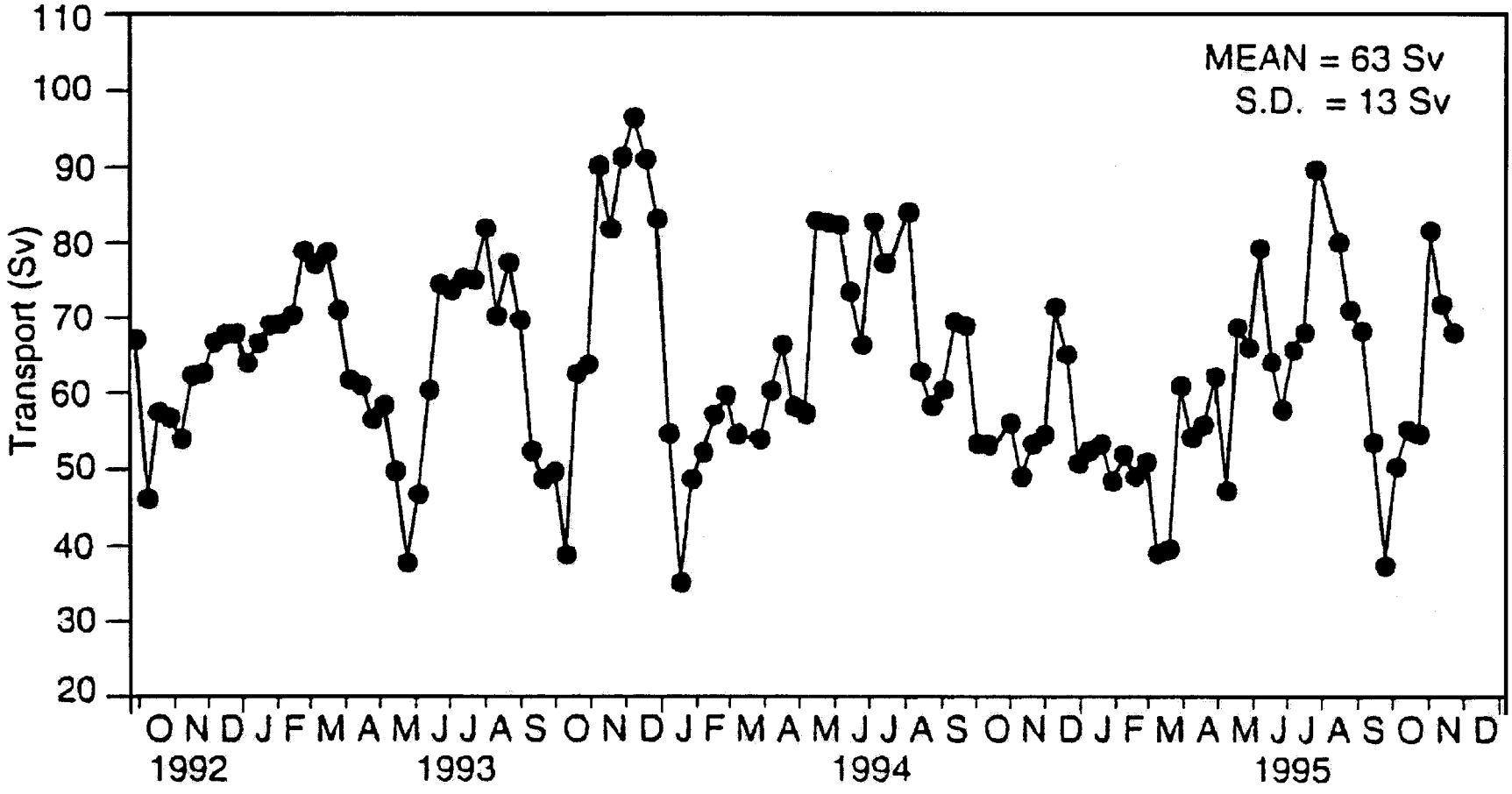
- **Comparison of mesoscale variability with numerical model**



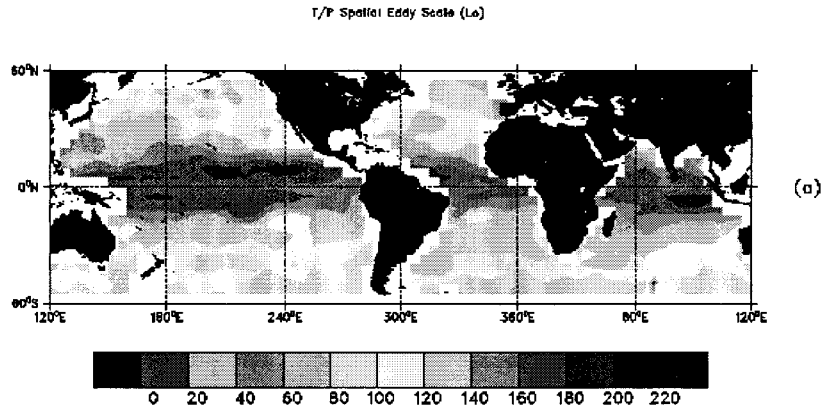
- **Observation of cuurent structure in coastal oceans**



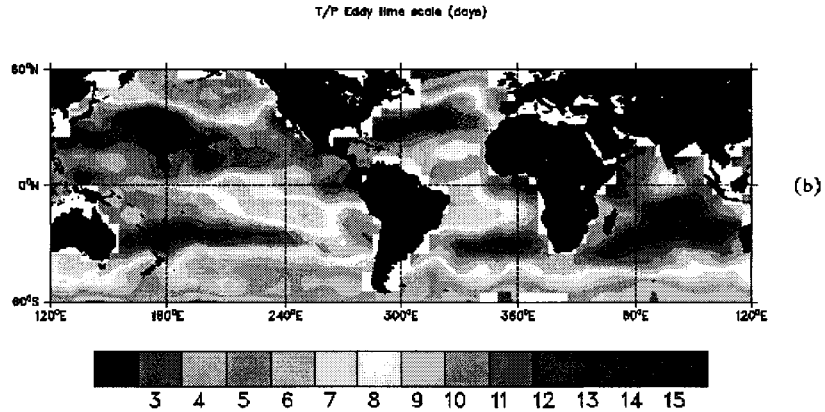
- **Monitor the transport of Kuroshio**

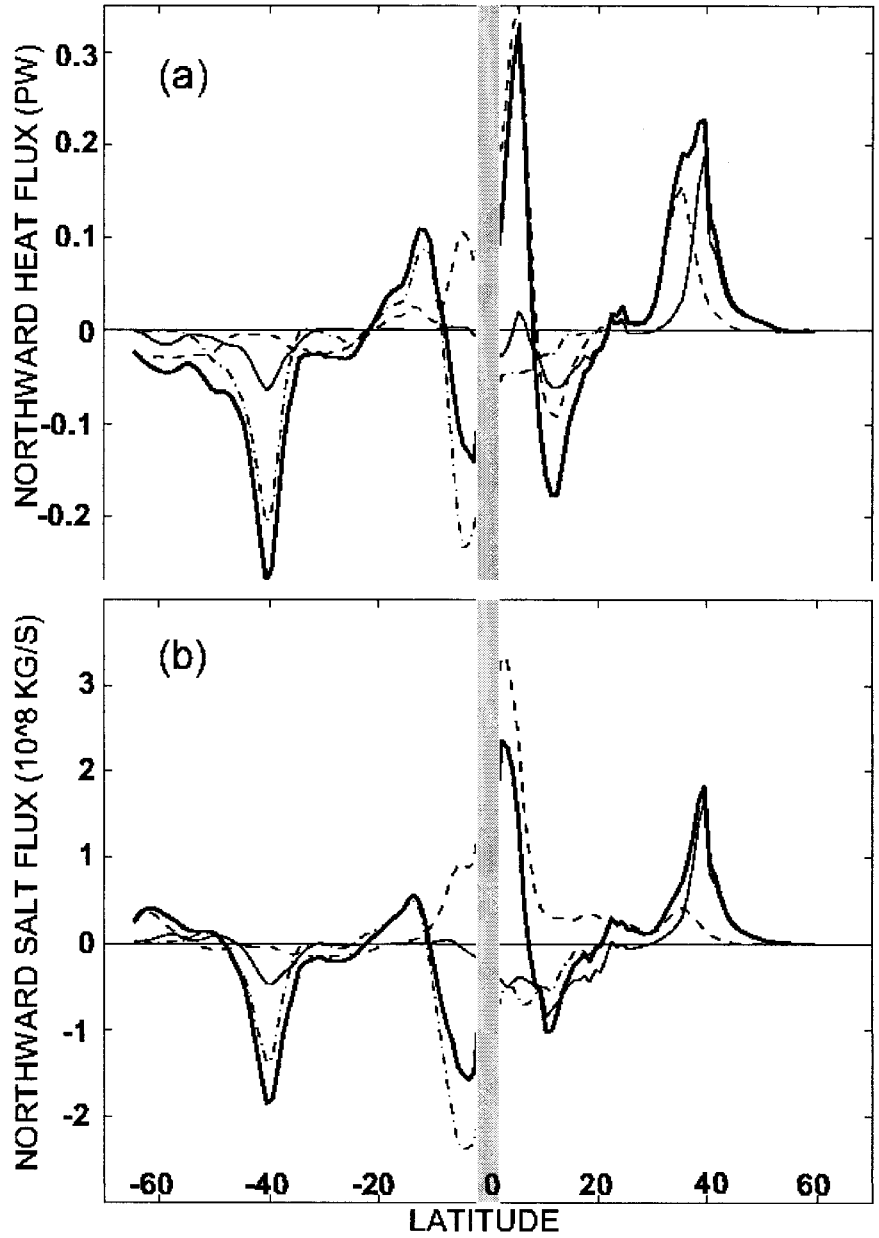


- **Spatial and Temporal Scales of Mesoscale Eddies**



(a)



(b)

- **Eddy heat and salt transports**