National Oceanic and Atmospheric Administration

OSCAR

Ocean Surface Current Analyses - Real time

NOAA/NESDIS

A Processing System and Web-Server using Jason IGDR Data to Provide Timely Surface Velocity Fields in the Tropical Pacific

National Oceanographic Partnerships Program (NOPP)

Jason-1/Topex/Poseidon Science Working Team Meeting

New Orleans, 21-23 October 2002

Poster Session G; Outreach and Databases

OSCAR is a pilot processing system and data center delivering tropical Pacific Ocean surface velocity fields via the Internet (**www.oscar.noaa.gov**). Surface currents are computed from satellite altimeter and vector wind data using methods developed during the Topex/Poseidon altimeter research mission. OSCAR is a transition to operational oceanographic applications using Jason-1 altimeter data. The various uses include large scale climate diagnostics and prediction, oceanographic education and research, fisheries management, monitoring debris drift, larvae drift, oil spills, fronts and eddies, search and rescue, naval and maritime operations, and idle curiosity. OSCAR provides velocity maps updated on a 1-week basis within 10 days of Jason altimeter measurements. This is made possible by (1) the rapid availability of Jason-1 Interim Geophysical Data Records (IGDRs) within 2-3 days delay from the time of satellite measurement, and (2) the fact that Jason-1 IGDR data approach the accuracy of scientific Topex/Poseidon and Jason-1 altimeter Geophysical Data Records (GDRs) which are generally delayed 1-2 months. The velocity fields are published in the monthly NOAA Climate Diagnostics Bulletin and are particularly useful in monitoring the recent evolution of ENSO conditions.

The pilot OSCAR web server allows user-selected geographic regions, display resolution and scaling of image display maps, as well as access to the entire Topex/Poseidon/Jason-derived field from 1993-present.

OSCAR Project Organization

Jason-1 Altimeter IGDR data

Real Time QuikScat Vector wind data

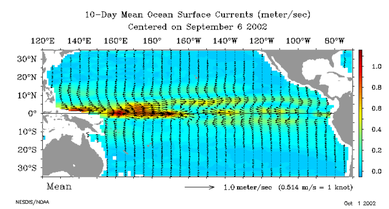
NOAA/NESDIS Program Manager
Bob Cheney

University of South Florida
Gary Mitchum
IGDR Processing to Gridded Surface Topography

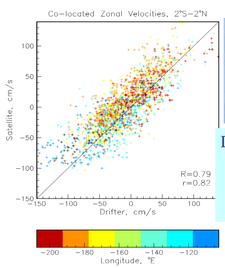
Earth & Space Research
Gary Lagerloef
Principal Investigator
Surface Current Vectors
Ground Calibration and Error Analysis

Florida State University
Mark Bourassa
Daily Gridded Vector Winds

Fabrice Bonjean *(ESR)* Surface current model development;
John Gunn *(ESR)* Data system;
Eric Johnson *(ESR)* Error analysis;
Nancy Soreide *(NOAA/PMEL)* WWW Site Development;
Laury Miller *(NOAA/NESDIS)* ENSO monitoring;
Yan Xue *(NOAANCEP)* ENSO monitoring;
Vern Kousky *(NOAA/NCEP)* ENSO monitoring;
Richard Legeckis *(NOAA/NESDIS)* Instability waves;
Jeff Polovina *(NOAA/NMFS)* Fisheries;
Gregg Jacobs *(NRL)* Navy model assimilation comparisons;

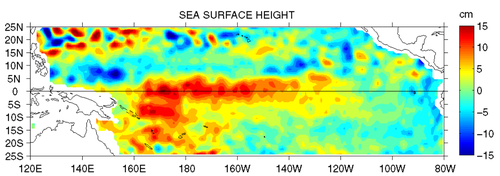


The Currents are Validated with Drifter Data

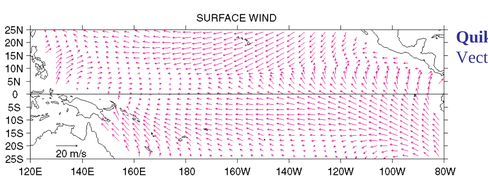


Data comparison
East-west equatorial current:
Mean difference = 10 cm/s (0.2 Kt)
RMS difference = 25 cm/s (0.5 Kt)
Correlation = 0.82

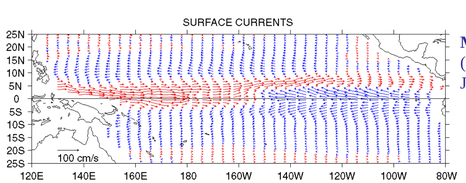
A Dynamic Model[1] uses Satellite Sea Level and Vector Wind Measurements to Compute Tropical Surface Currents on and off the Equator



Jason-1 Altimeter
Sea level deviations
(These are added to the mean Levitus dynamic height, which is not shown here).



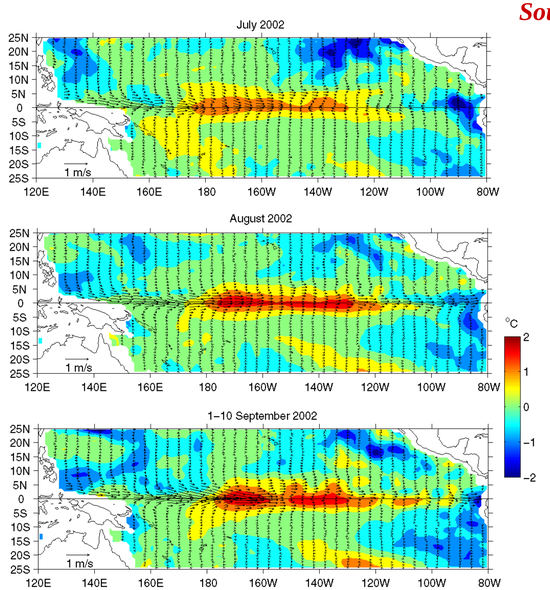
QuikScat Scatterometer
Vector wind



Model Surface Current
(averaged over the top 30 m)
July 2002 example, spatially smoothed

[1]Bonjean, F., and G.S.E. Lagerloef, 2002: Diagnostic model and analysis of the surface currents in the tropical Pacific Ocean, *Journal of Physical Oceanography*, 32, 2938-2954.

Monitoring the El Niño Southern Oscillation (ENSO)



The July-September 2002 Data Indicate that the Present El Niño Flow is Intensifying

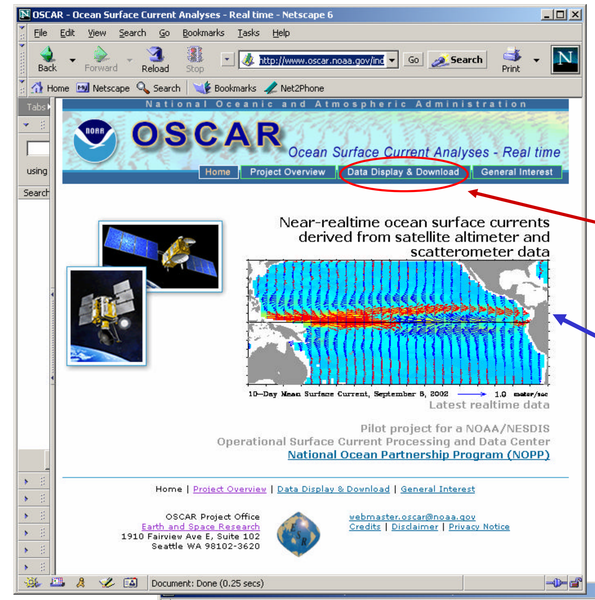
Previous analysis shows that strong eastward current anomalies coincide with El Niño.

(Anomalies are the difference between the monthly current and the seasonal mean.)

The sequence from July through early September 2002 is shown with the current anomalies plotted on top of SST anomalies.

The eastward flow has grown steadily stronger in the western half of the equatorial Pacific. *(Vectors are horizontally smoothed to remove eddies).*

Internet Access is Now Online



The data are updated 3 times per month, within 10 days of satellite observations.

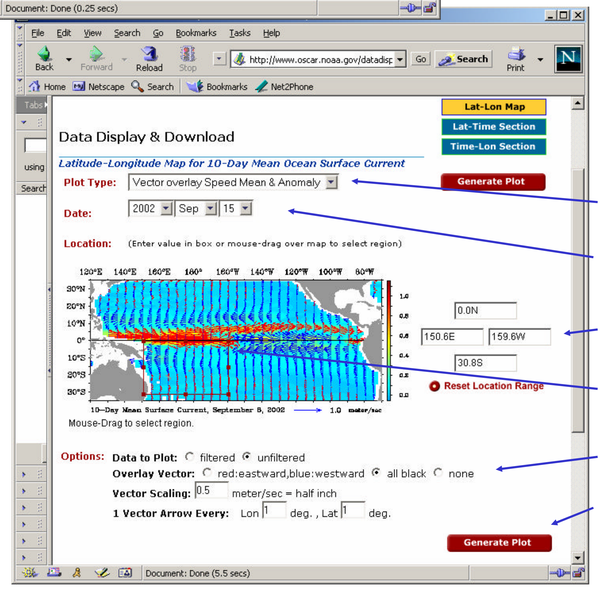
The Data Display link will give you various options to plot surface current maps in any sub-area of the tropical Pacific between latitudes 35ºN and 35ºS.

The most recent 10-day average data are displayed on the home page.

The web site is presently being developed and tested. We welcome your comments for improving the latest online version.

Please try it out and tell us what you think.

Choose Display Options



Vector or scalar options

Date (1993-present)

Enter Latitude/Longitude range
Or
Use mouse to select box

Select spatial filter, color, scaling, and plot density

Click "Generate Plot"