Date: 2000 PDT August 31, 2006
To: NOAA Coordinator Doug Helton and NOAA SSC Demian Bailey

FROM: NOAA/Hazardous Materials Response Division
Modeling and Simulation Studies
Seattle, WA 98115

SUBJECT: Super Typhoon Ioke, Wake Island

FOR ADDITIONAL INFORMATION, PLEASE CONTACT CJ Beegle-Krause
MODELING AND SIMULATION STUDIES, NOAA, SEATTLE, WA 98115.
PHONE (206) 526-4911.

We have looked at the issue of potential oil releases and container movement caused by the passage of Super Typhoon Ioke. These notes are based on the following information:

> Of particular concern are three large jp-5 fuel oil tanks. The USCG reports that one tank is empty, one has 200,000 gallons, and one has 2 million gallons in a tank with a capacity of 4 million gallons. The tanks are all above ground. All are steel with concrete foundations, and were recently refurbished but USCG is concerned that they may float off their foundations, collapse, or suffer puncture/piping damage. The potential for pollution and structure impacts are high, with some predicting extensive damage and/or destruction of all non-concrete structures.
>
> Pollution concerns include the above mentioned JP-5 tanks, chlorine tanks for water treatment, and various warehouses and storage containers with industrial materials such as paints, fuels, and other contaminants. Some of these containers may be mobilized or overturned by the winds and storm surges, possibly leaving them in the adjacent lagoon. There are also multiple structures, vehicles and small harbor vessels that may be mobilized and sunken in the lagoon. These may pose pollution, harbor navigation and marine debris threats

If any of this initial information is incorrect, please let us know ASAP as it would affect any trajectory implications.

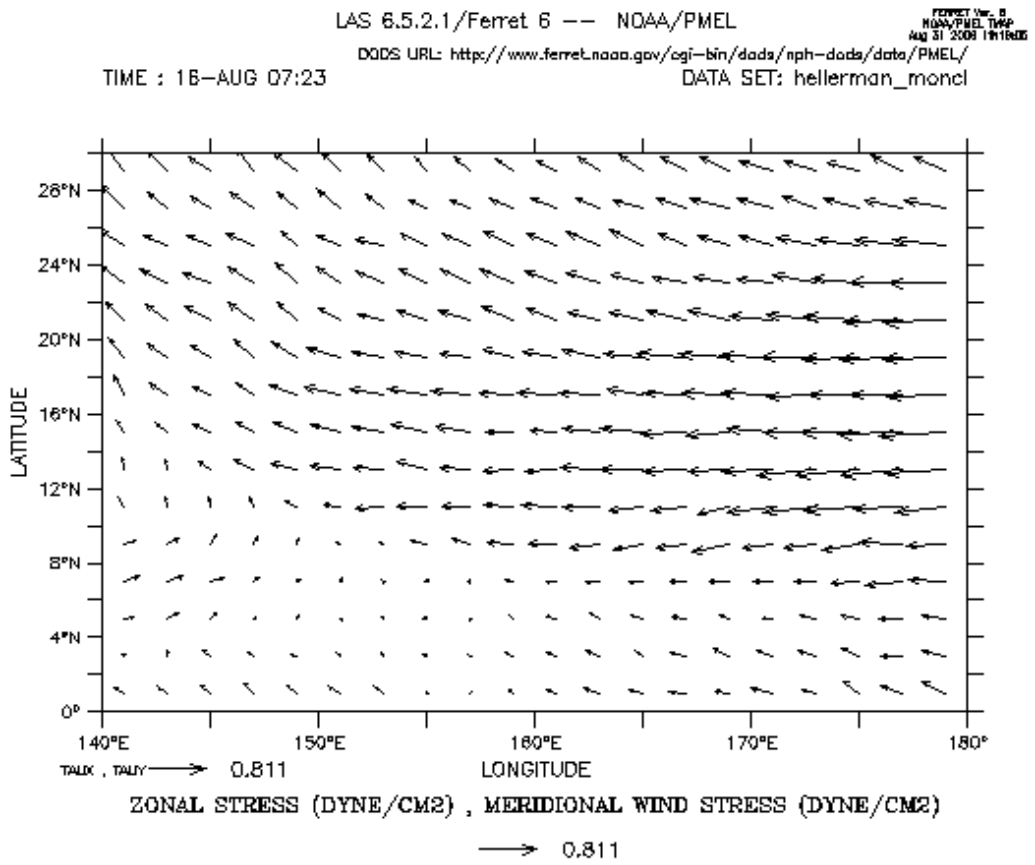
Large Scale Wind and Current Circulation Discussion

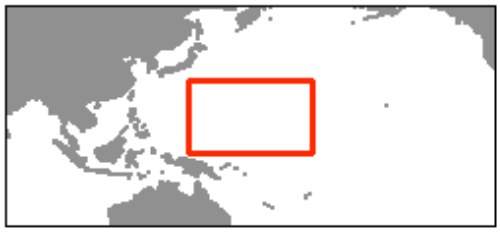
Hazmat has been requested to provide a larger scale circulation discussion to extend the briefing materials supplied this morning. Concerns relate to the long term trajectories of drifting containers and floating debris related the recent typhoon. Both the winds and currents determine the overall drift of floating materials. The higher the object sits at the water surface, the more influence the wind has in addition to the currents. The discussion is organized to cover first the winds and then the currents in the area in space and time.

References

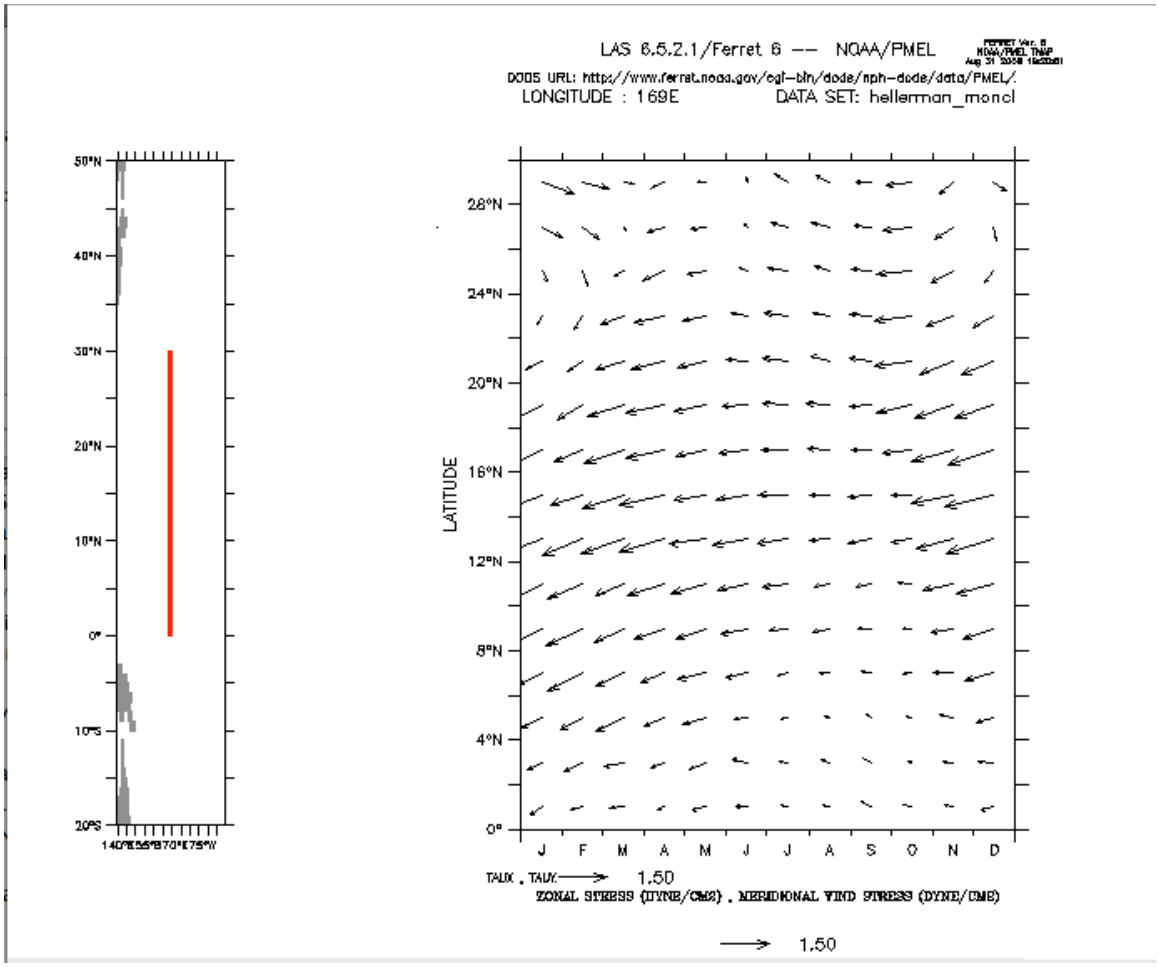
Bonjean F. and G.S.E. Lagerloef, 2002: Diagnostic Model and Analysis of the Surface Currents in the Tropical Pacific Ocean, Journal of Physical Oceanography, Vol. 32, No. 10, pages 2938-2954.

Hellerman, S., and M. Rosenstein 1983: Normal monthly wind stress over the world ocean with error estimates, Journal of Physical Oceanographer 13: 1093-1104.

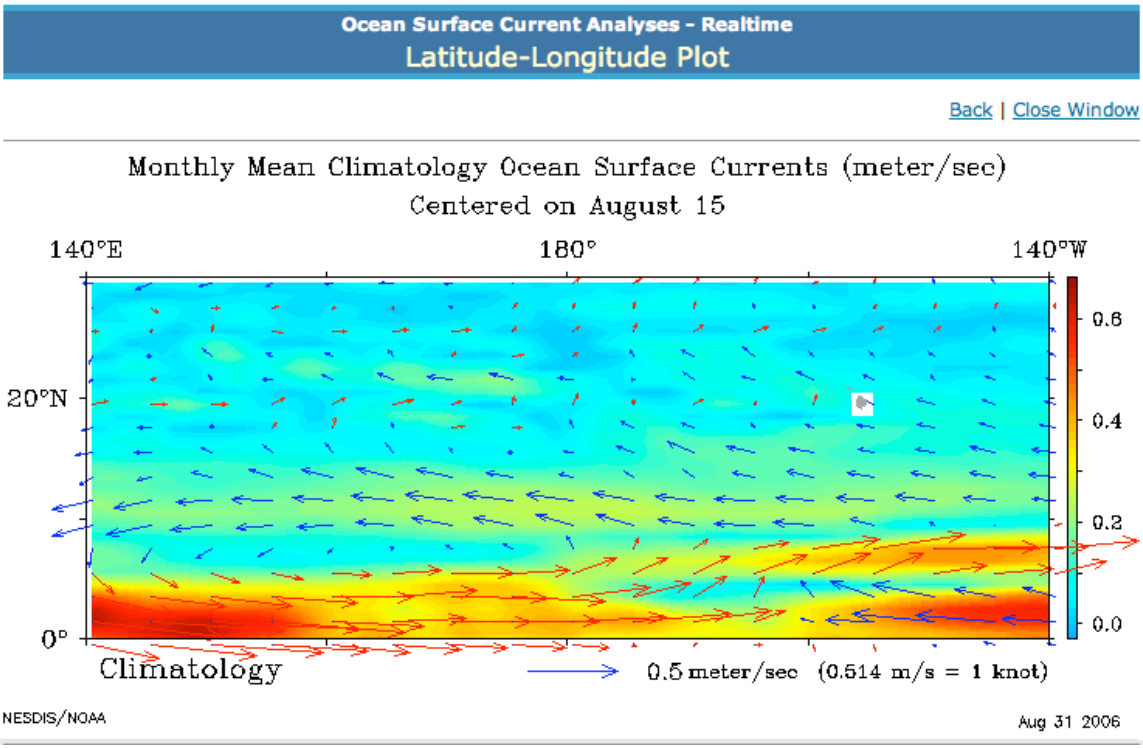




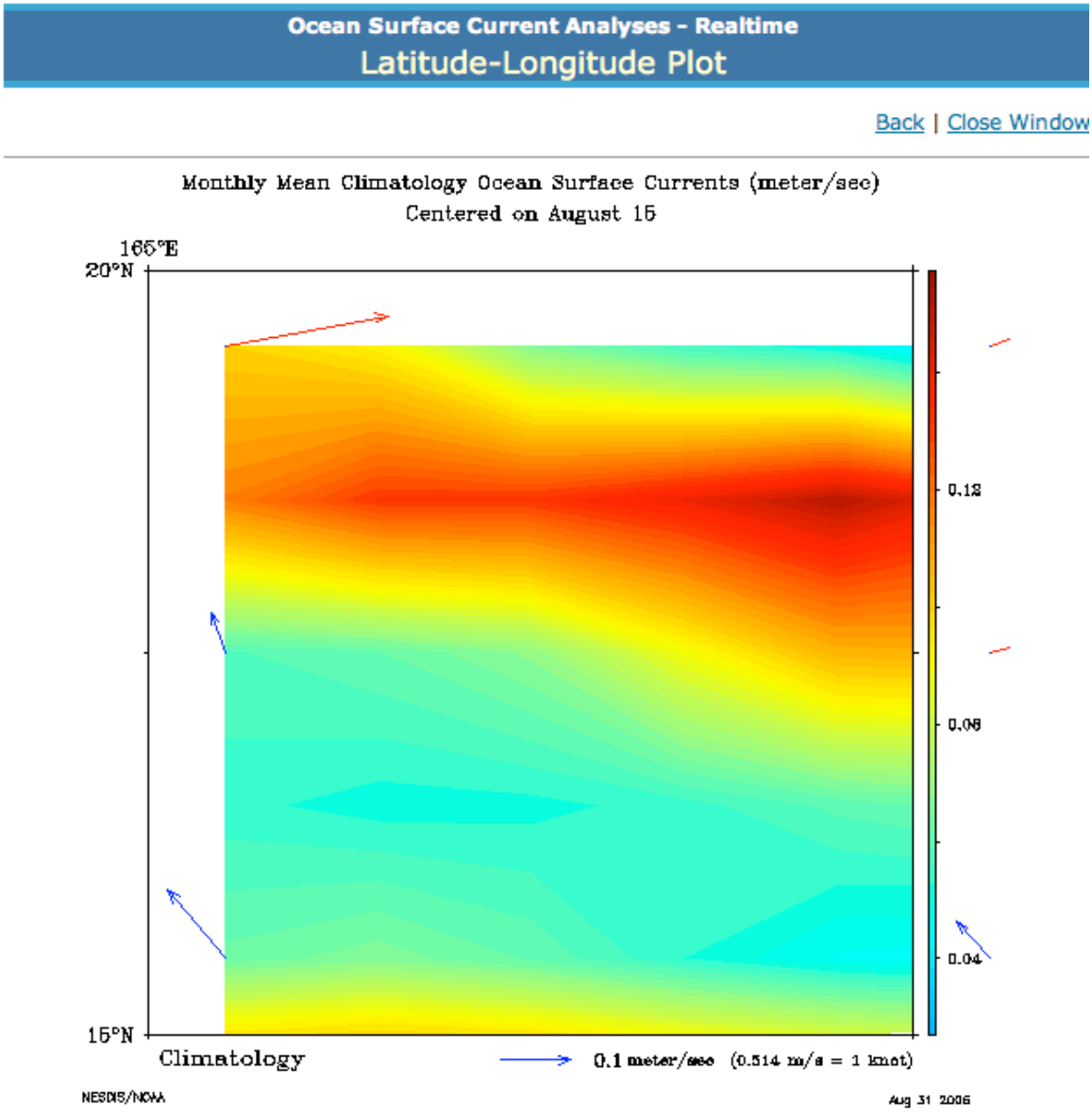
Picture 1. This plot is from the Hellerman and Rosenstein Wind Stress Climatology showing monthly mean wind stress vectors for the month of August in the Wake Island region from 0 to 30°N and from 140 to 180°E. The area near Wake Island has wind with a dominant component from the east.



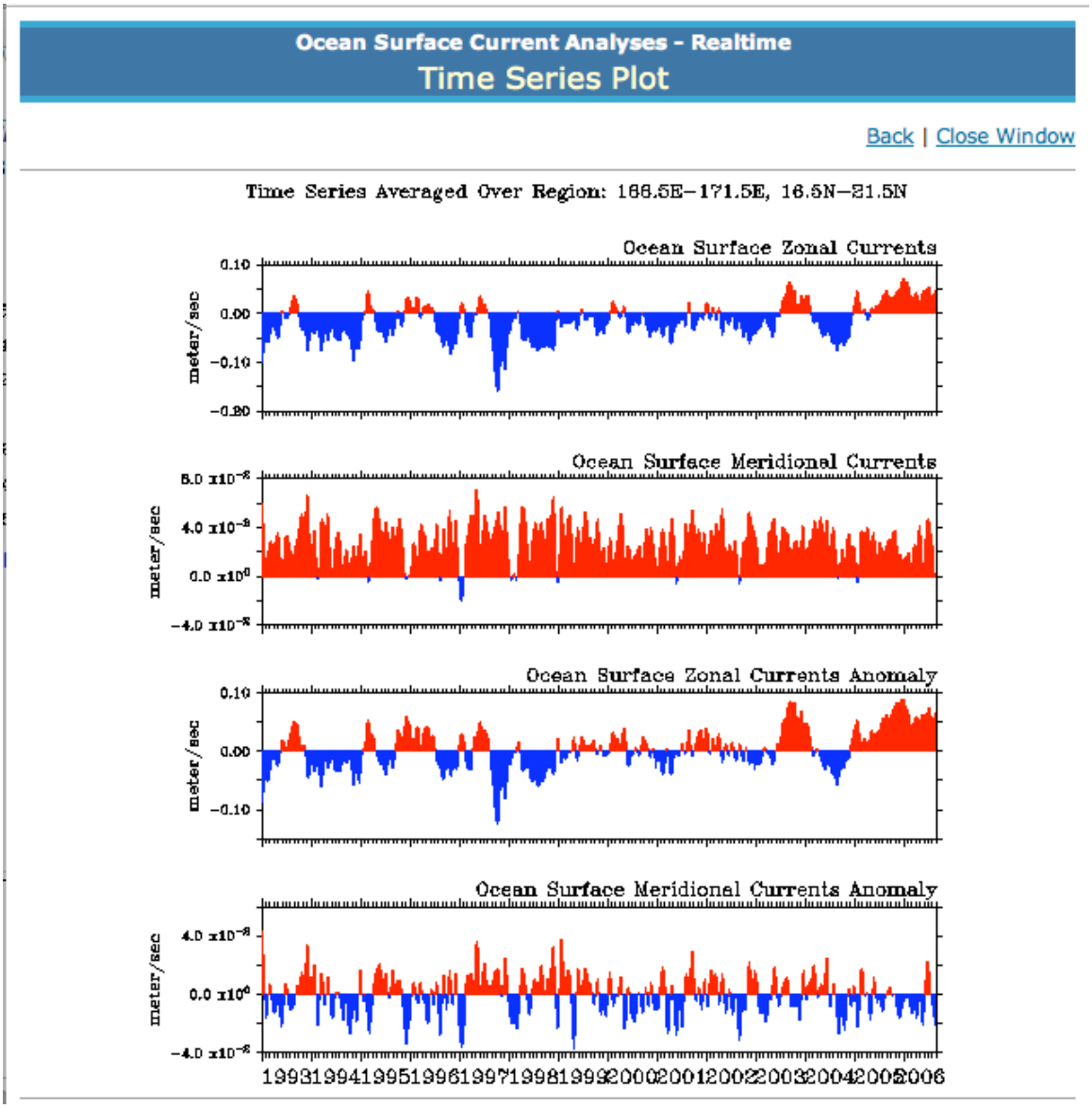
Picture 2. This plot is from the Hellerman and Rosenstein Wind Stress Climatology showing the annual cycle of winds in a north – south section from 0 to 30°N from January to December. Note that the winds are predominantly from the east with a varying smaller north or south component.



Picture 3. This plot from the NOAA Ocean Surface Current Analyses – Realtime system (http://www.oscar.noaa.gov/) for monthly mean surface currents centered on August 15th for the northern equatorial Pacific Ocean from 0-30°N and from 140°E to 140°W. Note that Wake Island is in the area of alternating zonal (east-west) jets. The plot is shaded by east/west current velocity with blue as westward and red and eastward. The vectors show velocity vectors with a scale of 50 cm/s as 1/2 inch.



Picture 4. This plot is from the NOAA Ocean Surface Current Analyses – Realtime system (http://www.oscar.noaa.gov/) for monthly mean currents centered on August 15th from 15 to 20°N and from 165 to 170°E. The plot is shaded by east/west current velocity with blue as westward and red and eastward. The vectors show velocity vectors with a scale of 5 cm/s as 1/2 inch.



Picture 5. This plot is from the NOAA Ocean Surface Current Analyses – Realtime system (http://www.oscar.noaa.gov/) for a time series of the currents from 1993 to 2006 averaged from 16.5 to 21.5°N and from 166.5 to 171.5°E. Note that the scale of the zonal (east-west currents) is in on the order of 10 cm/s while the meridional (north-south) current scale is in on the order of 1 cm/s. Currents are predominantly to the west with a small component to the north.