Tropical Cyclone Report
Tropical Storm Olivia
(EP152012)
6 – 8 October 2012

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Olivia was a short-lived tropical storm in the eastern North Pacific that remained far from land during its life cycle.

## a. Synoptic History

During early October, a combination of the ascending branch of the Madden-Julian Oscillation and an eastward moving atmospheric Kelvin wave created a favorable large-scale environment for convection over and near the Intertropical Convergence Zone (ITCZ). This, along with an upper-level trough, aided the formation of a surface trough along 105°W between 12-20°N on 3 October. The surface trough moved westward and weakened the next day. However, before weakening it helped produce a northward bend of the ITCZ between 105-115°W. A low pressure area formed in the bend on 5 October about 600 n mi south of the southern tip of the Baja California peninsula, and deep convection became concentrated near the center of the low later that day. The system subsequently became better organized, and it is estimated that a tropical depression formed around 1200 UTC 6 October about 745 n mi southwest of the southern tip of Baja California. The "best track" chart of the tropical cyclone's path is given in Fig. 1, with the wind and pressure histories shown in Figs. 2 and 3, respectively. The best track positions and intensities are listed in Table 1[1].

The depression moved westward as later that day it strengthened into a tropical storm within an environment of light vertical wind shear. On 7 October, a mid/upper-level trough over the northeastern Pacific weakened the ridge north of Olivia, allowing the cyclone to turn northward. The storm reached an estimated peak intensity of 50 kt late that day. On 8 October, strong southwesterly vertical wind shear developed over Olivia and the system became decoupled vertically. This shear caused the cyclone to weaken, and the now-shallow system started a southwestward motion. Olivia rapidly degenerated to a convectionless remnant low early on 9 October about 770 n mi west-southwest of the southern tip of Baja California, and the system subsequently moved west-southwestward before dissipating on 10 October.

[1] A digital record of the complete best track, including wind radii, can be found on line at ftp://ftp.nhc.noaa.gov/atcf. Data for the current year's storms are located in the *btk* directory, while previous years' data are located in the *archive* directory.

b. Meteorological Statistics

Observations in Olivia (Figs. 2 and 3) include subjective satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB), and objective Advanced Dvorak Technique (ADT) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Data and imagery from NOAA polar-orbiting satellites including the Advanced Microwave Sounding Unit (AMSU), the NASA Tropical Rainfall Measuring Mission (TRMM), the European Space Agency's Advanced Scatterometer (ASCAT), and Defense Meteorological Satellite Program (DMSP) satellites, among others, were also useful in constructing the best track of Olivia.

The estimated peak intensity of 50 kt is based on a blend of subjective and objective Dvorak intensity estimates. There were no surface observations of tropical-storm-force winds from Olivia.

c. Casualty and Damage Statistics

There were no reports of damage or casualties associated with Olivia.

d. Forecast and Warning Critique

The genesis of Olivia was poorly forecast. The pre-Olivia disturbance was not mentioned in the Tropical Weather Outlook until 24 h before genesis, at which time it was give a low (less than 30%) chance of development during the next 48 hours. The development potential was rated as medium (30-50% chance) 12 h before genesis and was not raised to high (greater than 50% chance) until 6 h before genesis.

A verification of NHC official track forecasts for Olivia is given in Table 2a. Official forecast track errors were slightly greater than the mean official errors for the previous 5-yr period at 12-36 h, and less than the 5-yr mean at 48 h. The number of verifying forecasts is very small, with only 2 forecasts at 48 h. It should be noted that the Climatology-Persistence (OCD5) errors for Olivia were significantly higher than the 5-yr mean, indicating that the cyclone was more difficult to forecast than average. A homogeneous comparison of the official track errors with selected guidance models is given in Table 2b. The variable consensus model TVCN and the Geophysical Fluid Dynamics Laboratory model (GHMI) generally had lower average errors than the official forecast.

A verification of NHC official intensity forecasts for Olivia is given in Table 3a. Official forecast intensity errors were greater than the mean official errors for the previous 5-yr period from 12-36 h. The official errors were also greater than those of the OCD5 climatology-persistence model, which indicated that the forecasts lacked skill. However, the number of verifying forecasts is again very small. The intensity forecast errors mainly resulted from forecasts that, while correctly anticipating that shear would halt Olivia's development, incorrectly called for Olivia to become a hurricane before that occurred. A homogeneous

comparison of the official intensity errors with selected guidance models is given in Table 3b. The majority of the intensity guidance had lower average errors than the official forecasts, with the GHMI model having the best intensity forecast errors by a significant margin.

Watches and warnings were not required for Olivia.

Table 1. Best track for Tropical Storm Olivia, 6 – 8 October 2012.

| Date/Time (UTC) | Latitude (°N) | Longitude (°W) | Pressure (mb) | Wind Speed (kt) | Stage |
|---|---|---|---|---|---|
| 06 / 1200 | 13.5 | 118.0 | 1006 | 30 | tropical depression |
| 06 / 1800 | 13.7 | 119.3 | 1004 | 35 | tropical storm |
| 07 / 0000 | 13.9 | 120.1 | 1000 | 45 | " |
| 07 / 0600 | 14.2 | 120.7 | 998 | 50 | " |
| 07 / 1200 | 14.6 | 120.8 | 997 | 50 | " |
| 07 / 1800 | 15.3 | 120.8 | 997 | 50 | " |
| 08 / 0000 | 15.9 | 120.8 | 998 | 50 | " |
| 08 / 0600 | 16.2 | 120.9 | 999 | 50 | " |
| 08 / 1200 | 16.5 | 121.2 | 1002 | 45 | " |
| 08 / 1800 | 16.3 | 121.2 | 1005 | 40 | " |
| 09 / 0000 | 15.9 | 121.3 | 1007 | 30 | low |
| 09 / 0600 | 15.4 | 121.7 | 1008 | 30 | " |
| 09 / 1200 | 15.0 | 122.2 | 1009 | 25 | " |
| 09 / 1800 | 14.7 | 122.7 | 1009 | 25 | " |
| 10 / 0000 | 14.3 | 123.5 | 1009 | 20 | " |
| 10 / 0600 | 14.0 | 124.3 | 1009 | 20 | " |
| 10 / 1200 | 13.7 | 125.1 | 1009 | 20 | " |
| 10 / 1800 | | | | | dissipated |
| 07 / 1200 | 14.6 | 120.8 | 997 | 50 | maximum wind and minimum pressure |

Table 2a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Olivia, 6 – 8 October 2012. Mean errors for the 5-yr period 2007-11 are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

| | Forecast Period (h) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 12 | 24 | 36 | 48 | 72 | 96 | 120 |
| OFCL (Olivia) | 33.8 | 50.8 | 67.4 | **68.3** | | | |
| OCD5 (Olivia) | 54.4 | 112.3 | 199.3 | 217.6 | | | |
| Forecasts | 8 | 6 | 4 | 2 | | | |
| OFCL (2007-11) | 28.6 | 46.3 | 62.7 | 78.1 | | | |
| OCD5 (2007-11) | 38.5 | 74.8 | 116.0 | 159.8 | | | |

Table 2b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Olivia, 6 - 8 October 2012. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 2a due to the homogeneity requirement.

| Model ID | Forecast Period (h) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 12 | 24 | 36 | 48 | 72 | 96 | 120 |
| OFCL | 31.4 | 55.0 | 74.2 | 81.6 | | | |
| OCD5 | 54.6 | 132.4 | 237.0 | 299.3 | | | |
| GFSI | 34.3 | 61.7 | 90.8 | 125.0 | | | |
| GHMI | 31.7 | **51.2** | **55.3** | **45.8** | | | |
| HWFI | 33.4 | 59.0 | 74.7 | **70.9** | | | |
| NGXI | 34.3 | 58.2 | 89.5 | 83.2 | | | |
| EMXI | 39.5 | **53.2** | 79.6 | **78.5** | | | |
| CMCI | 38.3 | **50.1** | 79.7 | 123.2 | | | |
| TVCN | **29.2** | **52.1** | **63.8** | **69.1** | | | |
| FSSE | 31.6 | 55.7 | 76.4 | 82.7 | | | |
| AEMI | **28.6** | 56.6 | 85.9 | **65.9** | | | |
| LBAR | 45.8 | 104.4 | 176.9 | 215.5 | | | |
| BAMS | 54.0 | 114.6 | 172.6 | 186.9 | | | |
| BAMM | 57.0 | 105.0 | 149.3 | 171.9 | | | |
| BAMD | 58.3 | 105.6 | 149.2 | 201.9 | | | |
| Forecasts | 7 | 5 | 3 | 1 | | | |

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Olivia, 6 - 8 October 2012. Mean errors for the 5-yr period 2007-11 are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

| | Forecast Period (h) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 12 | 24 | 36 | 48 | 72 | 96 | 120 |
| OFCL (Olivia) | 8.1 | 11.7 | 15.0 | **12.5** | | | |
| OCD5 (Olivia) | 6.5 | 10.7 | 14.5 | 6.0 | | | |
| Forecasts | 8 | 6 | 4 | 2 | | | |
| OFCL (2007-11) | 6.4 | 10.6 | 13.7 | 15.1 | | | |
| OCD5 (2007-11) | 7.5 | 12.4 | 16.1 | 18.4 | | | |

Table 3b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Olivia, 6 - 8 October 2012. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 3a due to the homogeneity requirement.

| Model ID | Forecast Period (h) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 12 | 24 | 36 | 48 | 72 | 96 | 120 |
| OFCL | 7.1 | 11.0 | 15.0 | 15.0 | | | |
| OCD5 | **5.7** | **9.8** | 15.3 | **8.0** | | | |
| HWFI | **6.0** | 11.2 | 17.7 | 23.0 | | | |
| GHMI | **5.1** | **6.6** | **8.0** | **3.0** | | | |
| DSHP | **5.4** | **7.2** | **12.0** | **12.0** | | | |
| LGEM | **5.4** | **7.2** | **12.7** | **7.0** | | | |
| ICON | **5.6** | **7.8** | **11.0** | **10.0** | | | |
| IVCN | **5.6** | **7.8** | **11.0** | **10.0** | | | |
| FSSE | 7.6 | 12.8 | 20.3 | 17.0 | | | |
| Forecasts | 7 | 5 | 3 | 1 | | | |

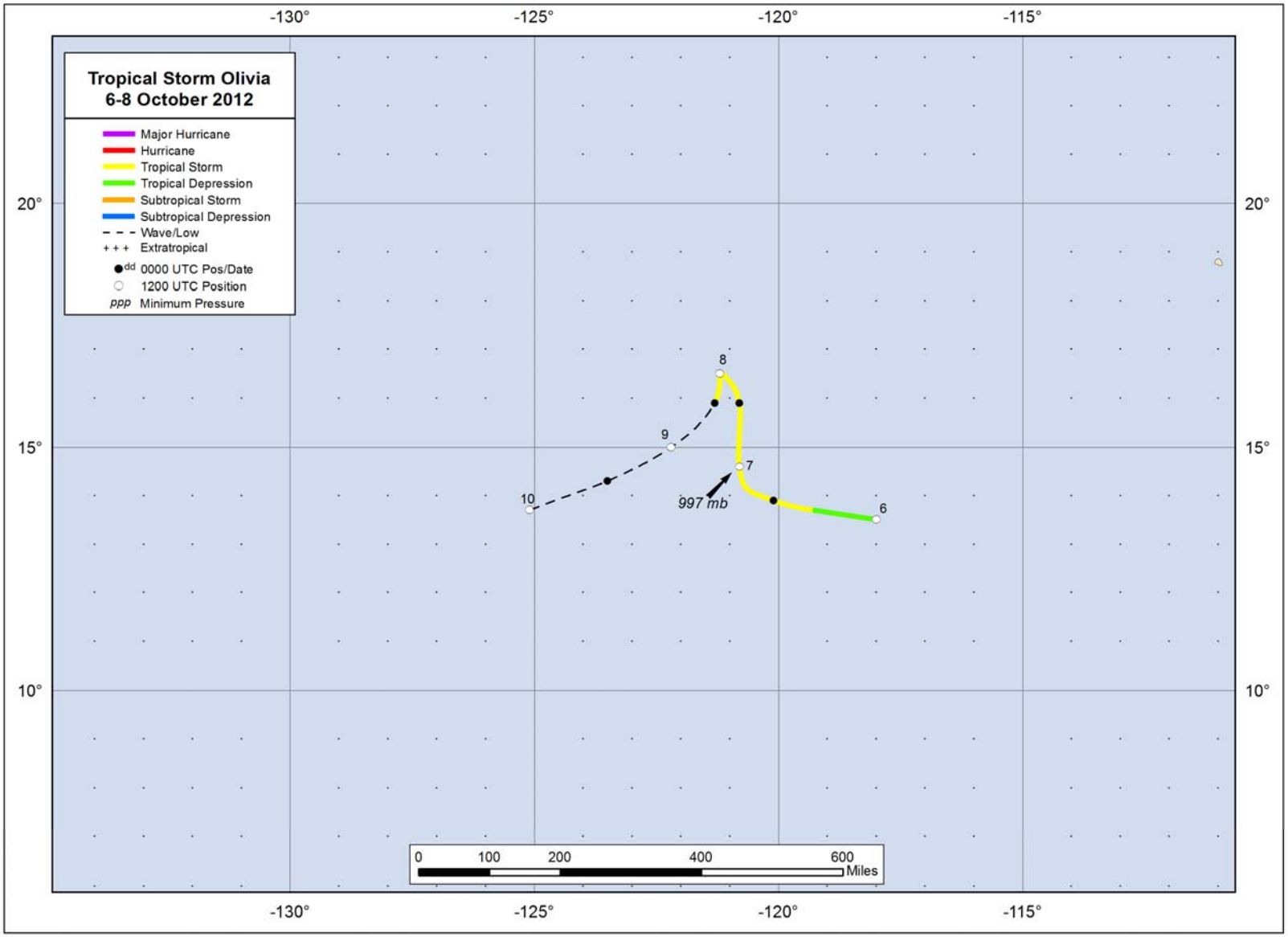


Figure 1. Best track positions for Tropical Storm Olivia, 6 – 8 October 2012.

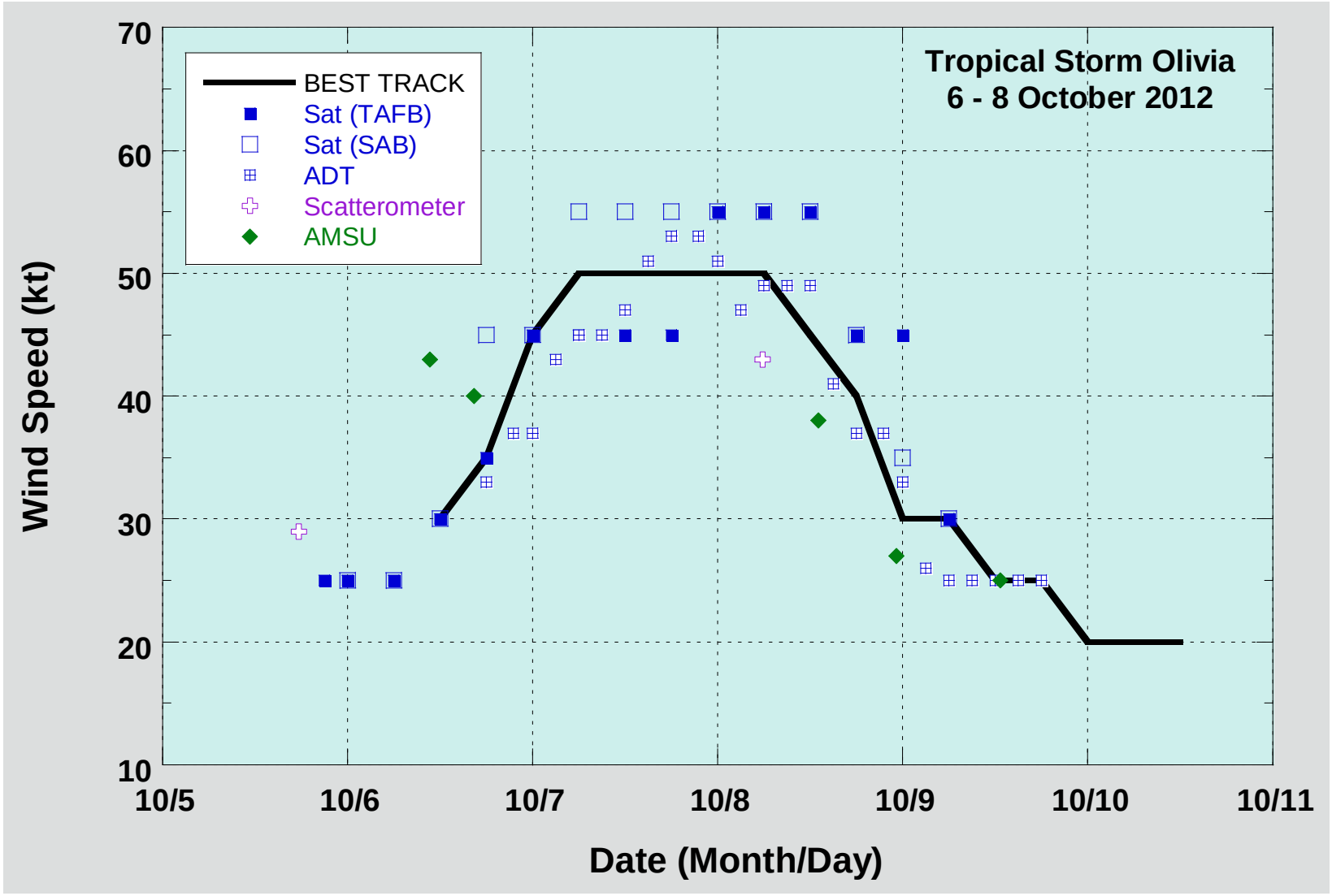


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Olivia, 6 – 8 October 2012. Advanced Dvorak Technique estimates represent CI numbers. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Dashed vertical lines correspond to 0000 UTC.

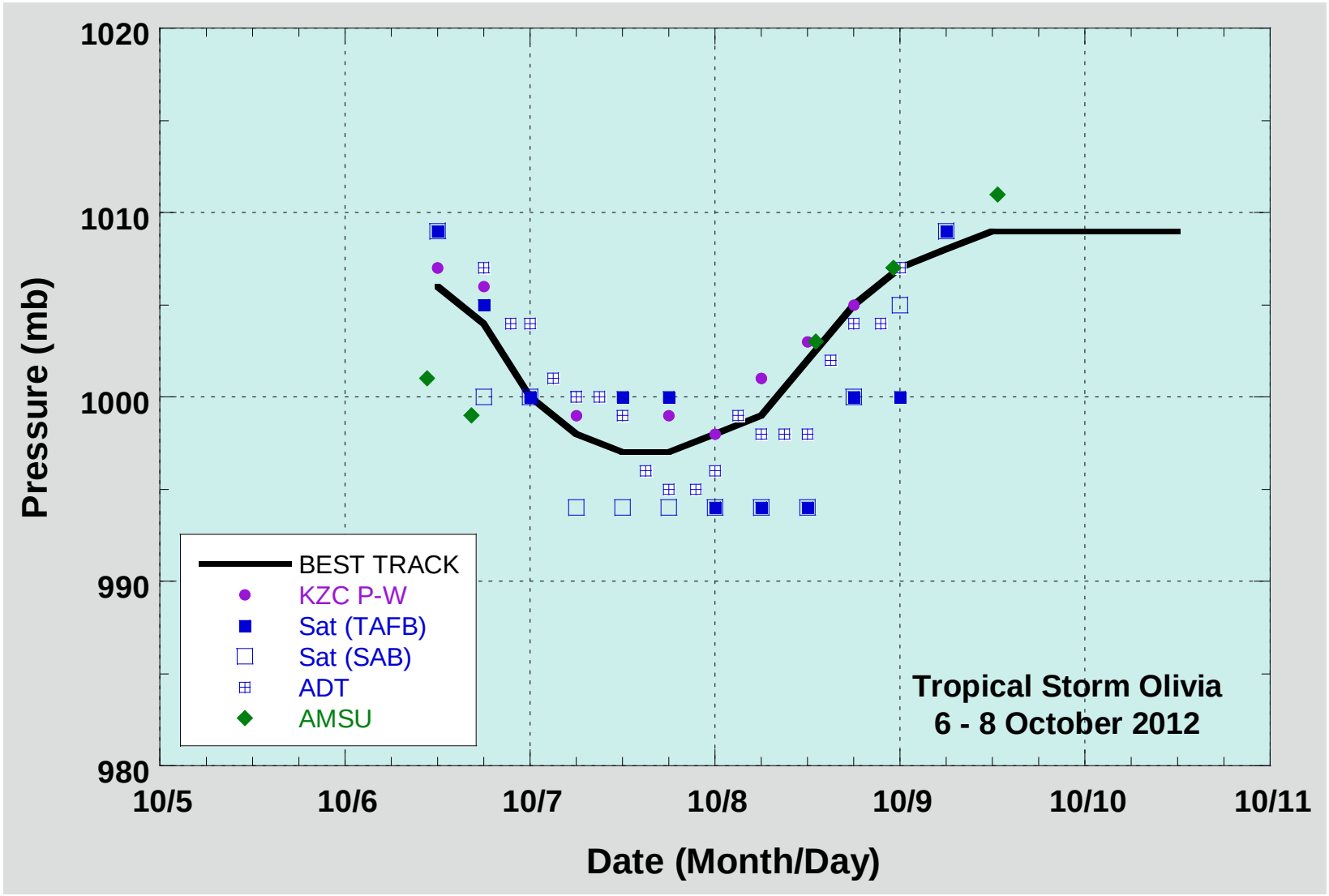


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Olivia, 6 – 8 October 2012. Advanced Dvorak Technique estimates represent CI numbers. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. The KZC P-W values are obtained by applying the Knaff-Zehr-Courtney pressure-wind relationship to the best track wind data. Dashed vertical lines correspond to 0000 UTC.