

Tropical Cyclone Report
Tropical Storm Aletta
(EP012012)
14-19 May 2012

Daniel P. Brown
National Hurricane Center
15 August 2012

Aletta was a tropical storm that did not affect land. It is only the third tropical storm on record to form prior to the 15 May official start date of the eastern Pacific hurricane season.

a. Synoptic History

Aletta originated from a broad low pressure area that developed along the intertropical convergence zone well south of Mexico on 11 May. The broad low appears to have formed during the passage of an eastward-moving Kelvin wave as suggested by Hovmöller diagrams of satellite imagery. Over the next day or so, the low remained nearly stationary several hundred nautical miles southwest of Acapulco, Mexico. On 13 May, the low-level circulation became better defined and early the next day thunderstorm activity became better organized, resulting in the formation of a tropical depression at 1200 UTC 14 May about 570 n mi south of Manzanillo, Mexico. 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 1¹.

After formation, the cyclone moved west-northwestward to the south of a mid-level ridge that extended westward from Mexico into the eastern Pacific basin. As the depression moved through an area of low vertical wind shear and over sea-surface temperatures of around 29°C, it strengthened and became a tropical storm by 0000 UTC 15 May. Aletta continued to strengthen and reached its peak intensity of 45 kt 18 h later. On 16 May, an upper-level trough approaching the cyclone from the west produced an increase in southwesterly shear as the storm turned westward. The moderate southwesterly shear and a drier and more stable air mass caused the shower and thunderstorm activity to decrease and become less organized. Aletta weakened steadily and became a tropical depression by 0600 UTC 17 May. About this time, a second deep-layer trough moving southeastward toward Baja California caused the ridge to weaken, which caused Aletta to turn northward. As the cyclone become a shallower system, it began moving slowly northeastward within an area of anomalous low-level southwesterly flow over the tropical eastern Pacific.

As the cyclone moved northeastward on 18 May, several bursts of convection formed that helped the system remain a tropical cyclone. However, thunderstorm activity diminished and the

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.

system degenerated into a remnant low by 0600 UTC 19 May about 520 n mi south-southwest of the southern tip of Baja California. The remnant low turned southeastward and dissipated by 0600 UTC 20 May.

b. Meteorological Statistics

Observations in Aletta (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). 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 Aletta.

ASCAT data from 1642 UTC 16 May suggest that the maximum winds were about 40 kt at that time, which was slightly higher than the operational intensity estimate. Since Aletta's convective organization reached a maximum about 12-18 h prior to the ASCAT overpass, the maximum intensity of the system is estimated to have been 45 kt. This analysis is also supported by Dvorak data T-numbers of 3.0 from SAB at 1800 UTC 15 May and 0600 UTC 16 May.

Aletta's formation marked only the third time in the satellite era (since 1966) that a tropical cyclone developed in the eastern North Pacific prior to the start of that basin's hurricane season. Hurricane Alma (1990) and an unnamed tropical storm (1996) are the only other tropical storms to form in the eastern North Pacific before 15 May.

There were no ship reports of winds of tropical storm force in association with Aletta.

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

The genesis of Aletta was fairly well predicted. Although routine Tropical Weather Outlooks (TWO) were not being issued because it was prior to the start of the hurricane season, the potential for genesis was discussed in several Special TWOs issued by the NHC. The first Special TWO was issued around 1435 UTC 12 May, a little less than 48 h before formation. At that time the disturbance was given a medium (30-50%) chance of development. The chance of formation was raised to the high category (greater than 50%) about 12 h before genesis occurred.

A verification of NHC official track forecasts for Aletta is given in Table 2a. Official forecast track errors were larger than the mean official errors for the previous 5-yr period. At 72 and 96 h the NHC track errors for Aletta were two to nearly three times larger than the long term

mean. A homogeneous comparison of the official track errors with selected guidance models is given in Table 2b. The NHC forecasts and the majority of the track models did not accurately predict Aletta's eventual northward and northeastward motion that occurred during the latter portion of the cyclone's life (Fig. 4). This resulted in the much larger than average track errors of the NHC forecasts at 72 and 96 h.

A verification of NHC official intensity forecasts for Aletta is given in Table 3a. Official intensity forecast errors were substantially lower than the mean official errors for the previous 5-yr period. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 3b. The intensity models (with the exception of the GHMI model) and the official forecasts generally predicted Aletta's maximum wind speed quite well. The NHC forecasts were superior to all of the intensity guidance, except at 12 h where it was slightly bettered by the variable consensus model (IVCN).

There were no coastal tropical cyclone watches or warnings issued in association with Aletta.

Table 1. Best track for Tropical Storm Aletta, 14-19 May 2012.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
13 / 1800	9.5	104.7	1008	25	low
14 / 0000	9.5	105.1	1008	25	"
14 / 0600	9.6	105.5	1007	25	"
14 / 1200	9.8	106.1	1006	30	tropical depression
14 / 1800	10.1	106.8	1006	30	"
15 / 0000	10.4	107.5	1004	35	tropical storm
15 / 0600	10.7	108.3	1003	35	"
15 / 1200	10.9	109.1	1002	40	"
15 / 1800	11.1	109.9	1001	45	"
16 / 0000	11.3	110.7	1000	45	"
16 / 0600	11.4	111.5	1000	45	"
16 / 1200	11.4	112.3	1001	45	"
16 / 1800	11.4	113.1	1002	40	"
17 / 0000	11.5	113.9	1003	35	"
17 / 0600	11.6	114.5	1004	30	tropical depression
17 / 1200	12.1	114.8	1005	30	"
17 / 1800	12.7	114.7	1005	30	"
18 / 0000	13.3	114.4	1005	30	"
18 / 0600	13.7	114.1	1005	30	"
18 / 1200	14.0	113.9	1006	30	"
18 / 1800	14.3	113.6	1006	30	"
19 / 0000	14.5	113.3	1006	25	"
19 / 0600	14.7	113.0	1006	25	low
19 / 1200	14.7	112.6	1006	25	"
19 / 1800	14.5	112.3	1007	25	"
20 / 0000	14.0	112.1	1007	25	"
20 / 0600					dissipated
16 / 0000	11.3	110.7	1000	45	Maximum winds and minimum pressure

Table 2a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Aletta, 14-19 May 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	29.8	57.8	73.5	99.1	238.2	419.7	
OCD5	41.8	95.6	154.2	193.7	283.3	333.7	
Forecasts	17	15	13	11	7	3	
OFCL (2007-11)	28.6	46.3	62.7	78.1	108.0	145.3	181.1
OCD5 (2007-11)	38.5	74.8	116.0	159.8	246.1	324.2	392.8

Table 2b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Aletta, 14-19 May 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	31.3	57.1	75.8	100.9	231.3		
OCD5	35.5	80.1	142.8	197.6	321.4		
GFSI	37.7	74.0	103.9	128.2	199.7		
GFDI	32.7	59.3	91.8	122.5	126.5		
HWFI	27.0	39.8	51.3	59.2	166.0		
UKMI	45.8	77.6	107.2	144.9	227.0		
EMXI	36.2	57.5	61.6	70.3	177.6		
CMCI	53.6	123.7	204.3	305.0	565.3		
AEMI	43.3	86.5	125.7	169.9	267.0		
TVCE	31.0	57.0	84.0	107.7	152.9		
LBAR	31.7	73.4	126.9	172.2	235.1		
BAMD	27.4	49.3	76.7	101.0	146.2		
BAMM	32.0	64.6	110.3	154.7	247.3		
BAMS	60.3	130.7	210.4	299.1	573.6		
Forecasts	10	10	10	9	4		

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Aletta, 14-19 May 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	2.6	2.3	4.2	4.5	3.6	5.0	
OCD5	3.1	5.2	10.6	18.9	28.1	28.7	
Forecasts	17	15	13	11	7	3	
OFCL (2007-11)	6.4	10.6	13.7	15.1	17.0	18.5	17.8
OCD5 (2007-11)	7.5	12.4	16.1	18.4	20.1	20.1	20.8

Table 3b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Aletta, 14-19 May 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	2.6	2.3	4.2	4.5	3.6	2.5	
OCD5	3.1	5.2	10.6	18.9	28.1	28.5	
HWFI	3.2	4.8	6.7	8.3	4.0	5.5	
GHMI	3.9	4.3	8.4	11.1	13.9	23.0	
DSHP	3.2	5.1	7.1	9.9	7.1	3.5	
LGEM	3.5	4.5	5.6	6.1	4.9	3.0	
ICON	2.7	2.6	5.0	8.3	6.3	6.0	
IVCN	2.5	2.6	4.7	7.5	6.3	6.0	
Forecasts	17	15	13	11	7	2	

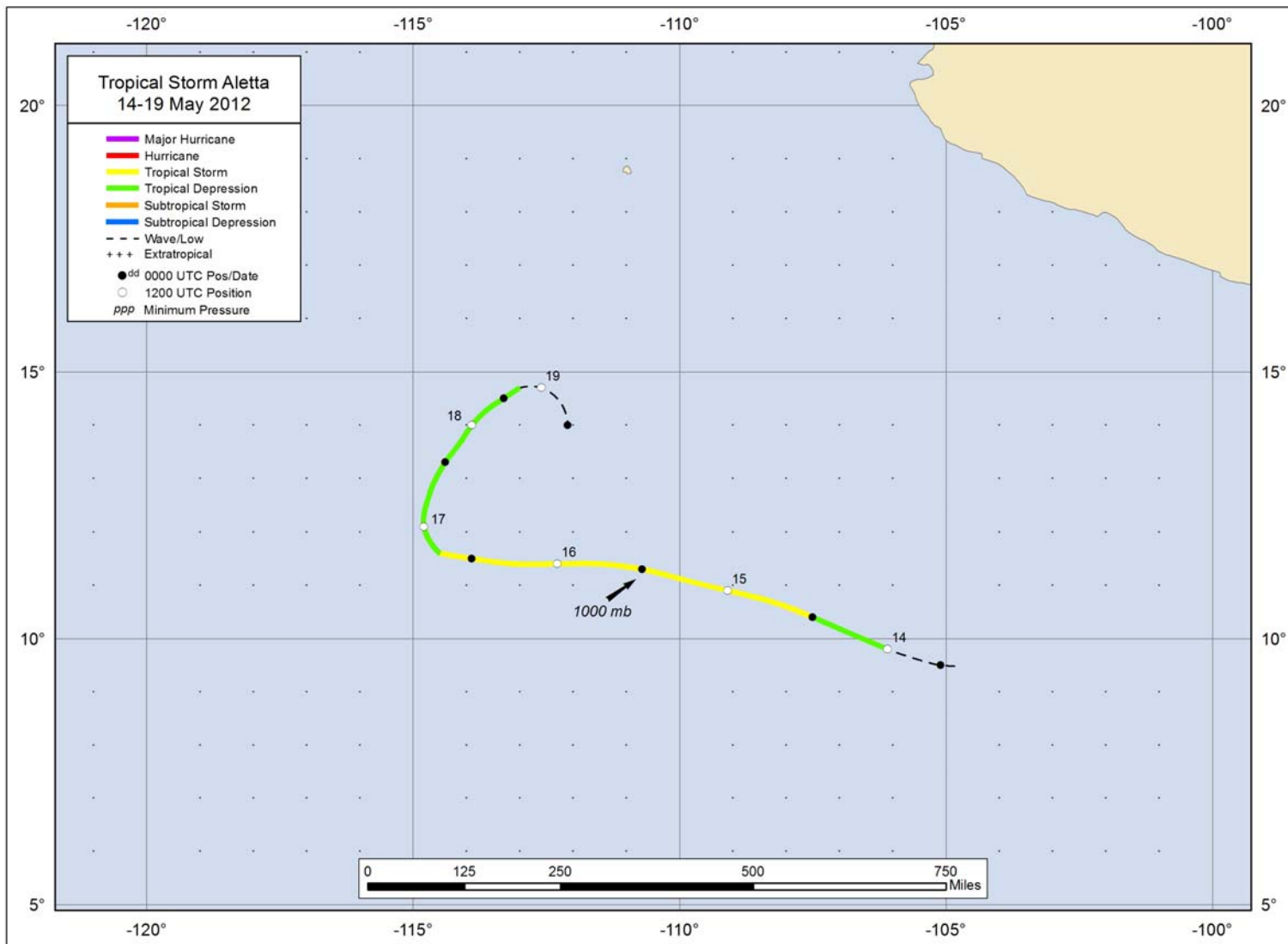


Figure 1. Best track positions for Tropical Storm Aletta, 14-19 May 2012.

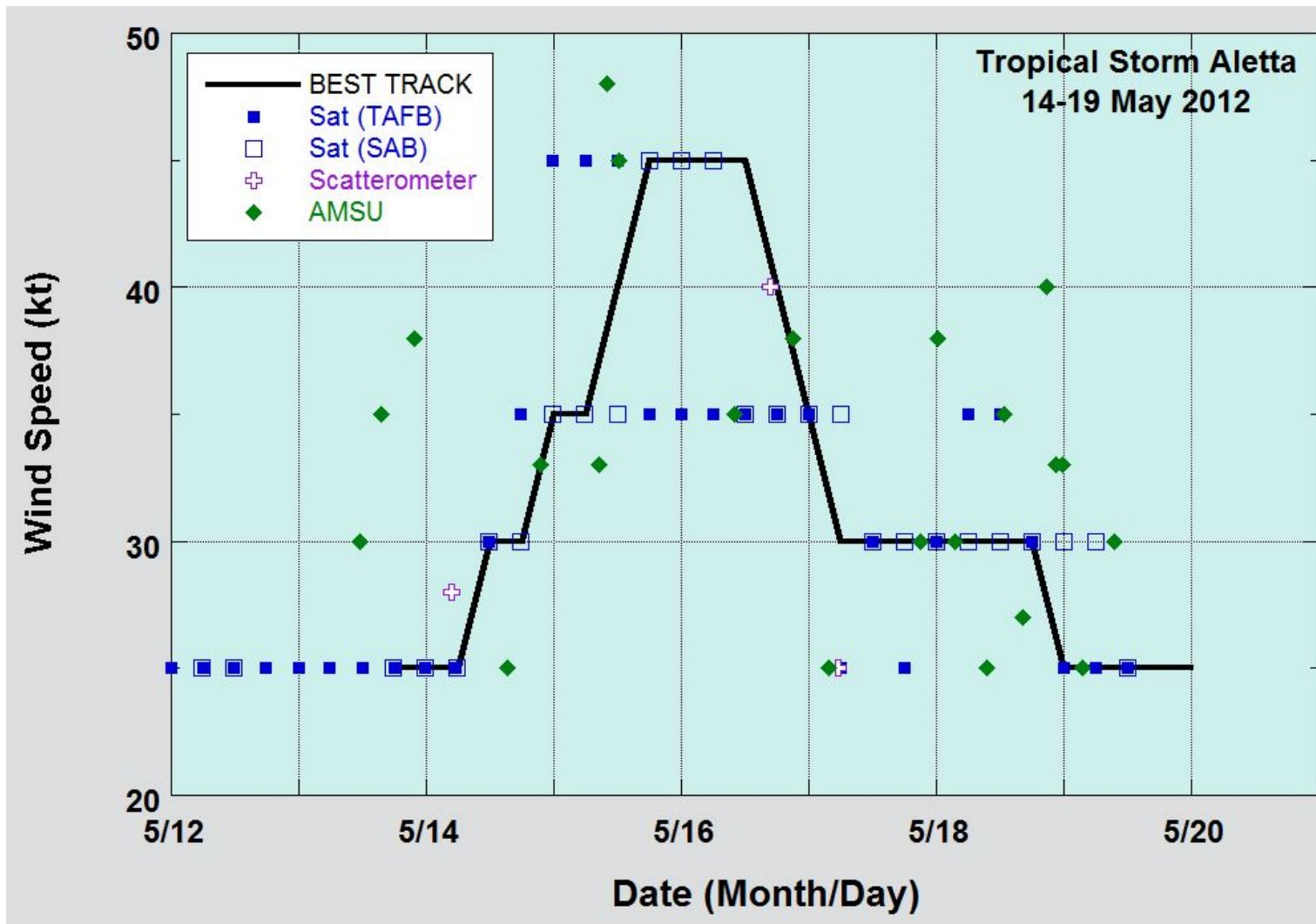


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Aletta, 14-19 May 2012. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Dashed vertical lines correspond to 0000 UTC.

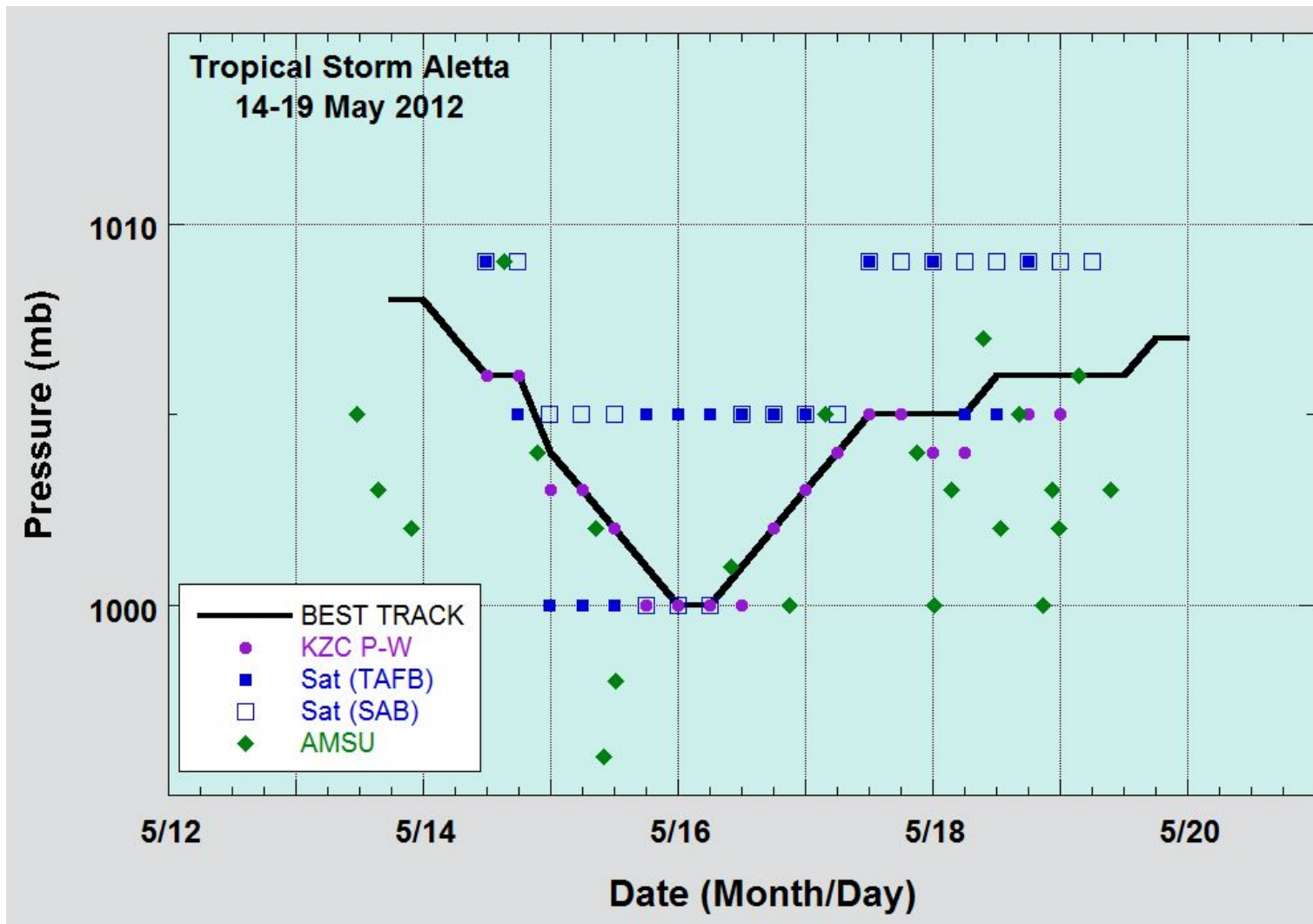
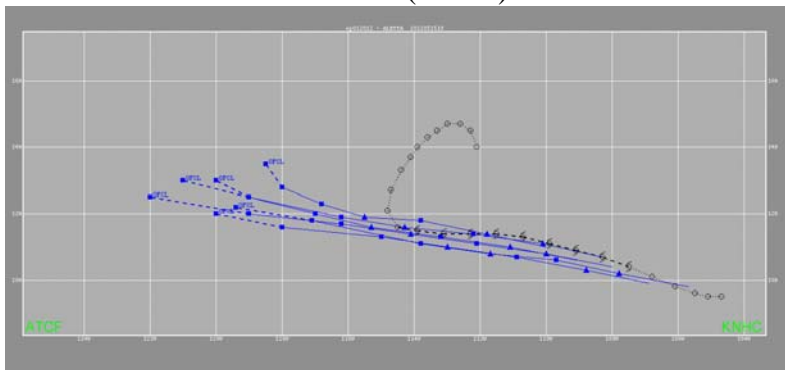
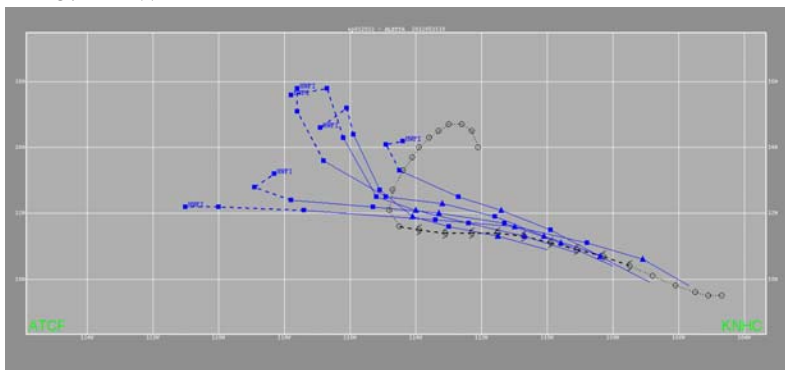


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Aletta, 14-19 May 2012. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. The KZC P-W values are obtained by applying the Knaff-Zehr-Courtney pressure-wind relationship to the best track wind data. Dashed vertical lines correspond to 0000 UTC.

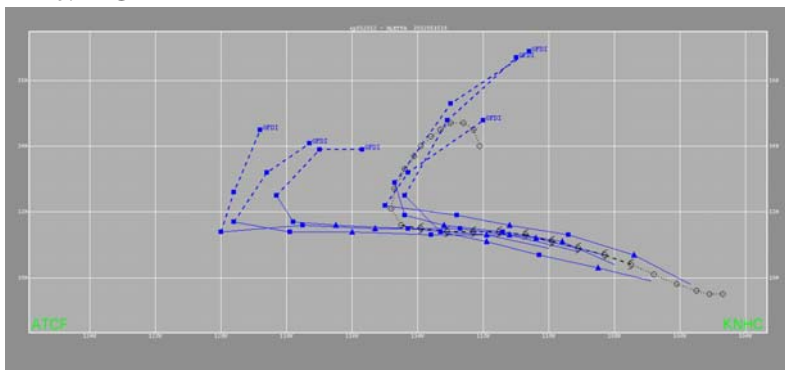
a. Official NHC forecasts (OFCL)



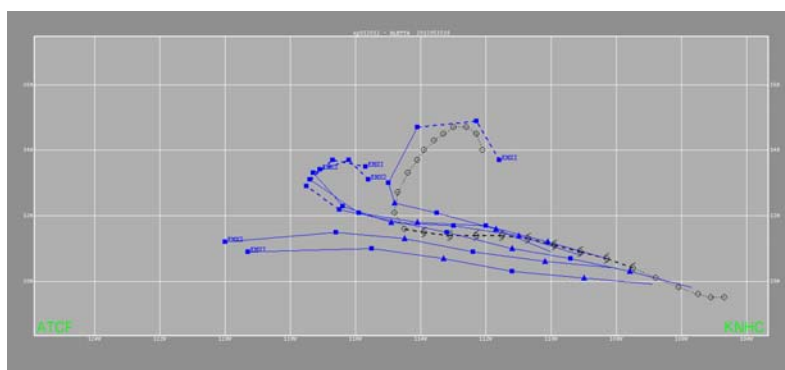
b. HWFI



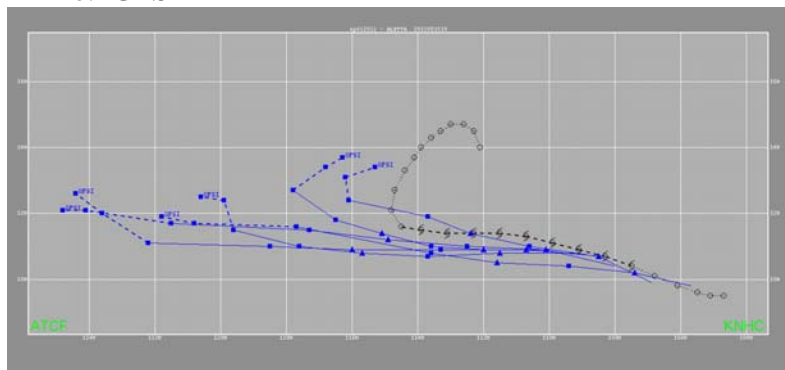
c. GFDL



d. EMXI and EMX2



e. GFSI



f. UKMI and UKM2

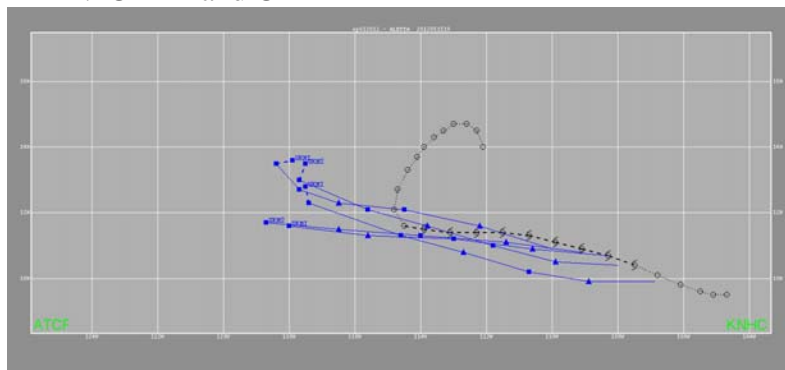


Figure 4. Official NHC (in black) and interpolated model track forecasts (in blue) for Tropical Storm Aletta every 6 h from 1200 UTC 14 May to 1800 UTC 15 May.