NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT[1]

HURRICANE ISELLE

(EP092014)

31 July – 9 August 2014

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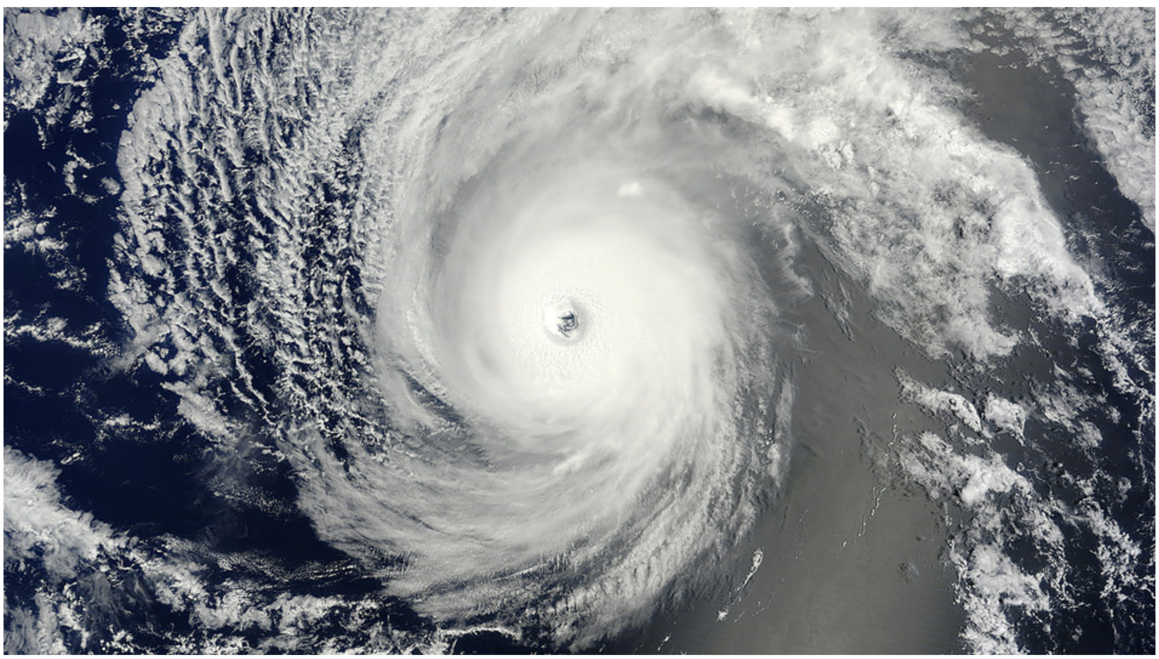
12 February 2016[1]



NASA MODIS IMAGE OF HURRICANE ISELLE AT 1940 UTC 4 AUGUST 2014

Iselle was a category 4 hurricane (on the Saffir-Simpson Hurricane Wind Scale) that formed in the central portion of the eastern Pacific basin.

[1] Original report date 29 January 2015. Updated 12 February 2016 to include best track analysis from CPHC.

Hurricane ISELLE

31 JULY – 9 AUGUST 2014

SYNOPTIC HISTORY

Iselle originated from an easterly wave that emerged from the northwest coast of Africa on 14 July. Although the wave produced little to no convection while moving across the Atlantic basin, it became convectively active when it reached the eastern Pacific basin on 25 July. The low-latitude wave initially changed little in organization, likely as a result of the northerly and subsident upper-level outflow associated with Hurricane Hernan to its northwest. By the time the wave crossed 110°W, the deep convection associated with the wave re-developed but did not become better organized, possibly due to enhanced easterly shear. A well-defined atmospheric Kelvin wave passing the wave around 29 July resulted in large-scale conditions conducive for genesis, including a decrease of the easterly shear and a more moist environment, and by 1200 UTC 30 July, a low pressure area formed in association with the wave about 825 n mi south-southwest of the southern tip of the Baja California peninsula. Deep convection accompanying the low remained disorganized until early on 31 July, when it increased in coverage and curved bands began to develop. A tropical depression formed by 1200 UTC 31 July, and the cyclone strengthened into a tropical storm 6 h later. The "best track" chart of Iselle'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[2]. (Please note that a post-storm analysis has not yet been completed for the portion of the track west of 140° W longitude, and that all data for this portion of the storm's history reflect near real-time estimates from the Central Pacific Hurricane Center (CPHC) in their area of responsibility. Once CPHC completes their post-storm analyses, this report will be updated.)

Iselle intensified while it moved west-northwestward during the next couple of days around the southwestern periphery of a mid-level ridge extending westward from Mexico. The cyclone reached hurricane strength 36 h after genesis, at 0000 UTC 2 August, and then rapidly intensified in an environment of moderate north-northeasterly shear during the following 24 h, while the hurricane's heading became more westerly. After becoming a major hurricane on 3 August, the hurricane's intensification rate slowed down until later that day, when the vertical wind shear over Iselle decreased significantly and the cyclone was moving nearly parallel to the 26° C isotherm. These factors likely contributed to the evolution of Iselle on 4 August into an annular structure (Knaff et al. 2003) characterized by a large eye, an axisymmetric ring of deep convection, and a distinct lack of convective bands (Fig. 4).

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[2] 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.

Some additional intensification took place on 4 August in a very low shear environment, and Iselle reached an estimated peak intensity of 120 kt at 1800 UTC while it approached 140°W. The forward speed then decreased and its heading shifted to just south of due west as a mid-latitude middle- to upper-level trough temporarily weakened the ridge to the north of the cyclone and caused the ridge's orientation to change. An increase in westerly shear and less favorable thermodynamic conditions disrupted Iselle's annular structure, and weakening commenced on 5 August. A re-strengthening mid-level ridge over the central Pacific resulted in Iselle's moving at a faster forward speed, and the hurricane crossed into the Central Pacific Hurricane Center's area of responsibility around 0000 UTC 6 August.

METEOROLOGICAL STATISTICS

Observations in Iselle (Figs. 2 and 3) include subjective satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB), CPHC, the Joint Typhoon Warning Center (JTWCO, 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 Iselle.

The estimated peak intensity of 120 kt for Iselle is based on Dvorak satellite classifications of T6.0/115 kt from TAFB and SAB at 1200 UTC 4 August, and UW-CIMSS ADT values of T6.3/122 kt around the same time.

No ship reports of tropical-storm-force winds or greater were received in association with Iselle to the east of 140°W.

CASUALTY AND DAMAGE STATISTICS

There were no reports of damage or casualties associated with Iselle east of 140°W.

FORECAST AND WARNING CRITIQUE

Genesis forecasts of Iselle recognized the possibility of genesis well in advance but not anticipate the actual genesis as the event approached (Table 2). The system from which Iselle developed was introduced into the short-range portion of the Tropical Weather Outlook (TWO) 36 h prior to formation and reached the medium category (30% to 50%) 18 h prior to genesis. However, the probabilities were only raised to the high category (greater than 50%) at the time of genesis. In contrast, the disturbance from which Iselle developed was introduced into the extended-range portion of the TWO nearly a week before genesis occurred. While there was greater lead time provided with respect to the genesis of Iselle, the forecasts incorrectly anticipated that large-scale conditions would become conducive for tropical cyclone formation sooner than they actually did. The negative effects related to the proximity of Hurricane Hernan cited previously were likely a cause for the delay in genesis. A medium chance of development within 5 days was indicated 60 h before genesis, and the probability was raised to the high category 36 h before Iselle formed.

A preliminary verification of NHC official track forecasts for Iselle is given in Table 3a. Official forecast track errors were substantially lower than the mean official errors for the previous 5-yr period and near-record values through 72 h. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b. Overall, the official forecast outperformed all of the guidance throughout the forecast period, even the hard-to-beat multi-model consensus, TVCE. Only TCON, TVCE, and the FSSE slightly bested the official track forecasts in the very short term (12 and 24 h), with FSSE, AEMI, and BAMS slightly outperforming the official track forecast at 120 h.

A preliminary verification of NHC official intensity forecasts for Iselle is given in Table 4a. Official forecast intensity errors were much greater than the mean official errors for the previous 5-yr period, especially beyond 36 h. The large errors at later times in the forecast period are largely associated with the rapid intensification of Iselle, which was not anticipated, and the development of the cyclone’s annular structure. The latter occurrence caused Iselle to retain a much higher intensity than what intensity guidance indicated was likely, given the marginal or even unfavorable thermodynamic conditions that prevailed. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. The intensity guidance for Iselle performed rather poorly, especially at later forecast times. Although the official forecast also had large errors, it bested nearly all of the guidance. Only the regional dynamical models, GHMI and HWFI, and multi-model consensus, ICON, did slightly better from 48 to 120 h.

References

Knaff, J.A., J.P. Kossin, and M. DeMaria, 2003: Annular Hurricanes. *Wea. Forecasting*, 18, 204-223.

Table 1. Best track for Hurricane Iselle, 31 July – 9 August, 2014.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
30 / 1200	11.3	117.9	1010	20	low
30 / 1800	11.6	119.3	1009	20	"
31 / 0000	11.9	120.4	1009	25	"
31 / 0600	12.1	121.1	1008	25	"
31 / 1200	12.4	121.8	1007	30	tropical depression
31 / 1800	12.8	122.5	1005	40	tropical storm
01 / 0000	13.2	123.4	1003	45	"
01 / 0600	13.6	124.3	1001	50	"
01 / 1200	13.9	125.2	998	55	"
01 / 1800	14.2	126.0	995	60	"
02 / 0000	14.6	126.9	991	65	hurricane
02 / 0600	14.8	127.9	988	70	"
02 / 1200	14.9	128.8	983	75	"
02 / 1800	15.0	129.6	975	85	"
03 / 0000	15.1	130.5	967	95	"
03 / 0600	15.2	131.4	966	95	"
03 / 1200	15.4	132.3	965	100	"
03 / 1800	15.7	133.2	964	100	"
04 / 0000	15.9	134.2	964	100	"
04 / 0600	16.0	135.2	958	110	"
04 / 1200	16.1	136.1	952	115	"
04 / 1800	16.1	136.9	947	120	"
05 / 0000	16.0	137.6	951	115	"
05 / 0600	15.9	138.3	955	110	"
05 / 1200	15.9	139.1	957	110	"
05 / 1800	16.2	139.9	967	95	"
06 / 0000	16.5	141.0	968	95	"
06 / 0600	16.7	142.3	977	85	"
06 / 1200	16.9	143.8	985	75	"
06 / 1800	17.0	145.2	982	80	"
07 / 0000	17.4	146.7	980	85	"

07 / 0600	17.9	148.3	982	80	"
07 / 1200	18.2	149.8	985	75	"
07 / 1800	18.7	151.5	990	70	"
08 / 0000	18.9	153.1	992	70	"
08 / 0600	18.9	154.4	997	60	tropical storm
08 / 1200	19.2	155.4	1001	50	"
08 / 1800	19.4	157.3	1006	40	"
09 / 0000	19.8	158.9	1010	35	"
09 / 0600	20.3	160.1	1011	30	low
09 / 1200	20.7	161.2	1011	30	"
09 / 1800	20.8	162.1	1012	25	"
10 / 0000	20.7	163.2	1012	25	"
10 / 0600	20.2	164.5	1012	20	"
10 / 1200	19.7	165.8	1012	20	"
10 / 1800					dissipated
04 / 1800	16.1	136.9	947	120	maximum wind and minimum pressure

Table 2. Number of hours in advance of formation associated with the first NHC Tropical Weather Outlook forecast in the indicated likelihood category. Note that the timings for the “Low” category do not include forecasts of a 0% chance of genesis.

	Hours Before Genesis	
	48-Hour Outlook	120-Hour Outlook
Low (<30%)	36	162
Medium (30%-50%)	18	60
High (>50%)	0	36

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Iselle. Mean errors for the previous 5-yr period 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	**12.9**	**21.3**	**25.1**	**31.4**	**47.1**	**77.4**	**103.4**
OCD5	22.2	44.2	69.2	92.5	144.3	171.5	216.8
Forecasts	21	21	21	21	21	18	14
OFCL (2009-13)	25.7	41.4	55.0	68.6	97.8	134.2	167.1
OCD5 (2009-13)	37.2	74.8	118.0	162.5	249.4	332.6	413.3

Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Iselle. 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	11.5	19.6	22.4	28.9	45.5	74.0	106.6
OCD5	19.2	40.3	64.6	85.8	138.5	163.1	228.7
GFSI	14.1	27.4	33.5	40.1	68.8	112.7	121.5
GHMI	18.2	33.8	40.0	46.6	62.5	133.1	221.9
HWFI	12.5	25.3	39.5	49.5	71.3	105.5	138.9
EGRI	16.3	26.5	35.7	46.9	71.1	104.9	172.9
EMXI	14.4	22.7	26.7	31.6	48.4	**71.2**	116.3
CMCI	28.4	50.1	61.9	75.1	102.8	160.6	254.9
TCON	**11.1**	**18.8**	25.5	30.6	48.7	84.7	125.3
TVCE	**10.6**	**18.9**	23.8	29.2	46.4	79.0	121.2
FSSE	11.8	**18.5**	24.5	32.7	54.6	76.1	**102.7**
AEMI	12.7	24.0	34.0	43.5	64.2	87.7	**105.3**
LBAR	16.5	47.2	80.3	111.6	170.1	209.8	141.4
BAMS	25.9	45.5	64.8	81.5	120.1	119.6	**86.4**
BAMM	13.3	23.9	39.3	54.1	91.6	116.3	126.1
BAMD	14.6	25.1	43.3	68.8	139.0	226.3	291.0
Forecasts	18	18	18	18	18	15	12

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Iselle. Mean errors for the previous 5-yr period 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	6.7	12.1	17.4	21.2	24.3	26.1	22.5
OCD5	8.6	15.7	21.5	24.2	27.3	28.7	22.2
Forecasts	21	21	21	21	21	18	14
OFCL (2009-13)	6.1	10.4	13.4	14.5	15.0	16.4	16.1
OCD5 (2009-13)	7.7	12.7	16.4	18.8	20.5	20.3	20.8

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Iselle. 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 4a due to the homogeneity requirement.

Model ID	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL	7.1	12.9	18.2	21.8	25.0	25.3	21.5
OCD5	9.0	16.4	22.1	24.7	28.2	27.4	**20.8**
HWFI	10.4	16.7	19.3	**20.9**	**21.3**	**21.9**	**19.5**
GHMI	12.2	20.7	27.6	27.0	**23.8**	**22.0**	**16.8**
DSHP	7.5	13.4	19.8	24.1	29.4	31.3	28.2
LGEM	8.4	16.3	22.1	25.8	28.1	28.0	23.2
ICON	9.1	16.3	21.2	23.6	**24.3**	**24.3**	**20.5**
FSSE	9.1	15.9	22.1	26.7	31.5	31.6	28.8
Forecasts	19	19	19	19	19	16	13

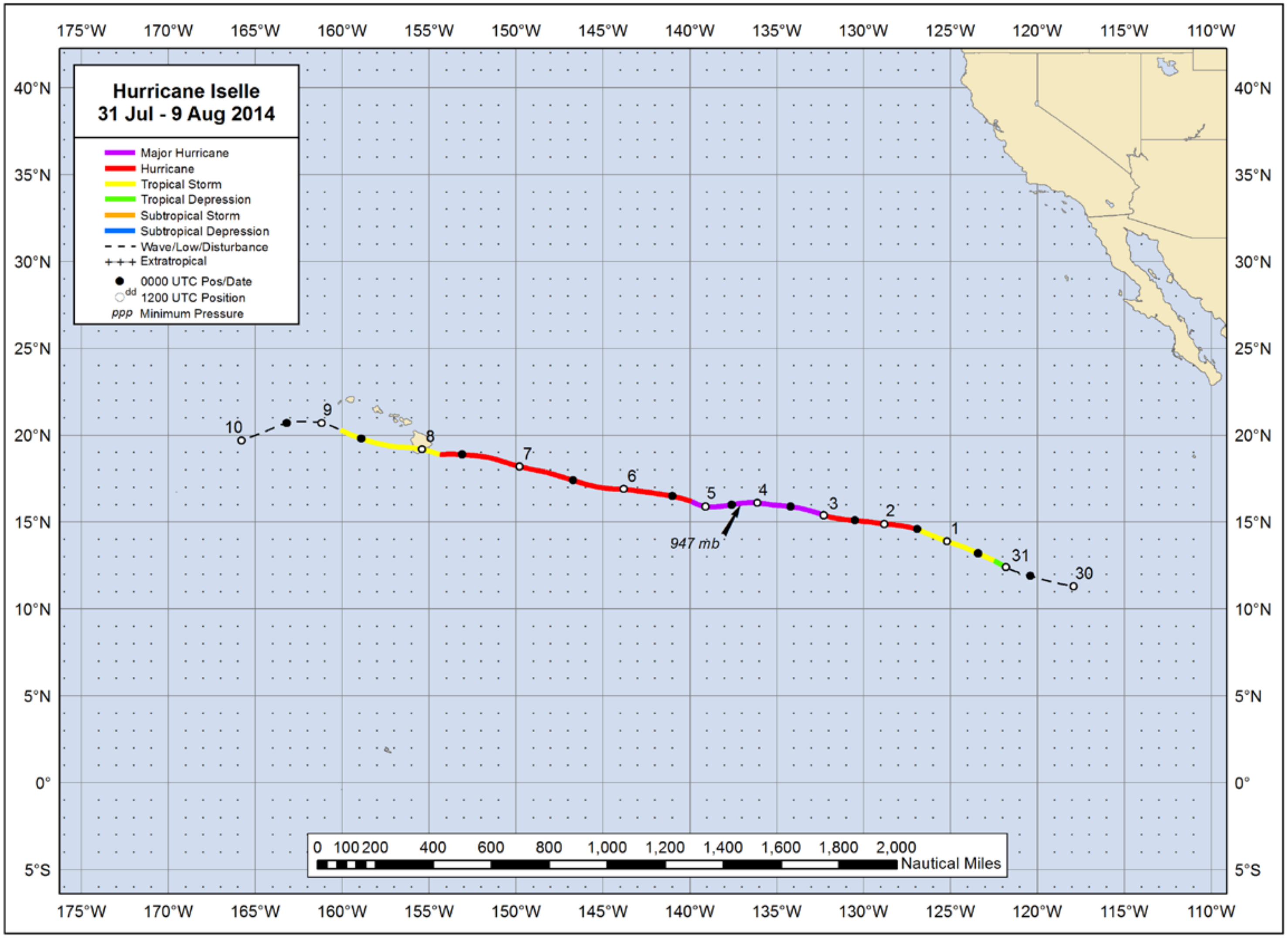

Figure 1. Best track positions for Hurricane Iselle, 31 July – 9 August, 2014.

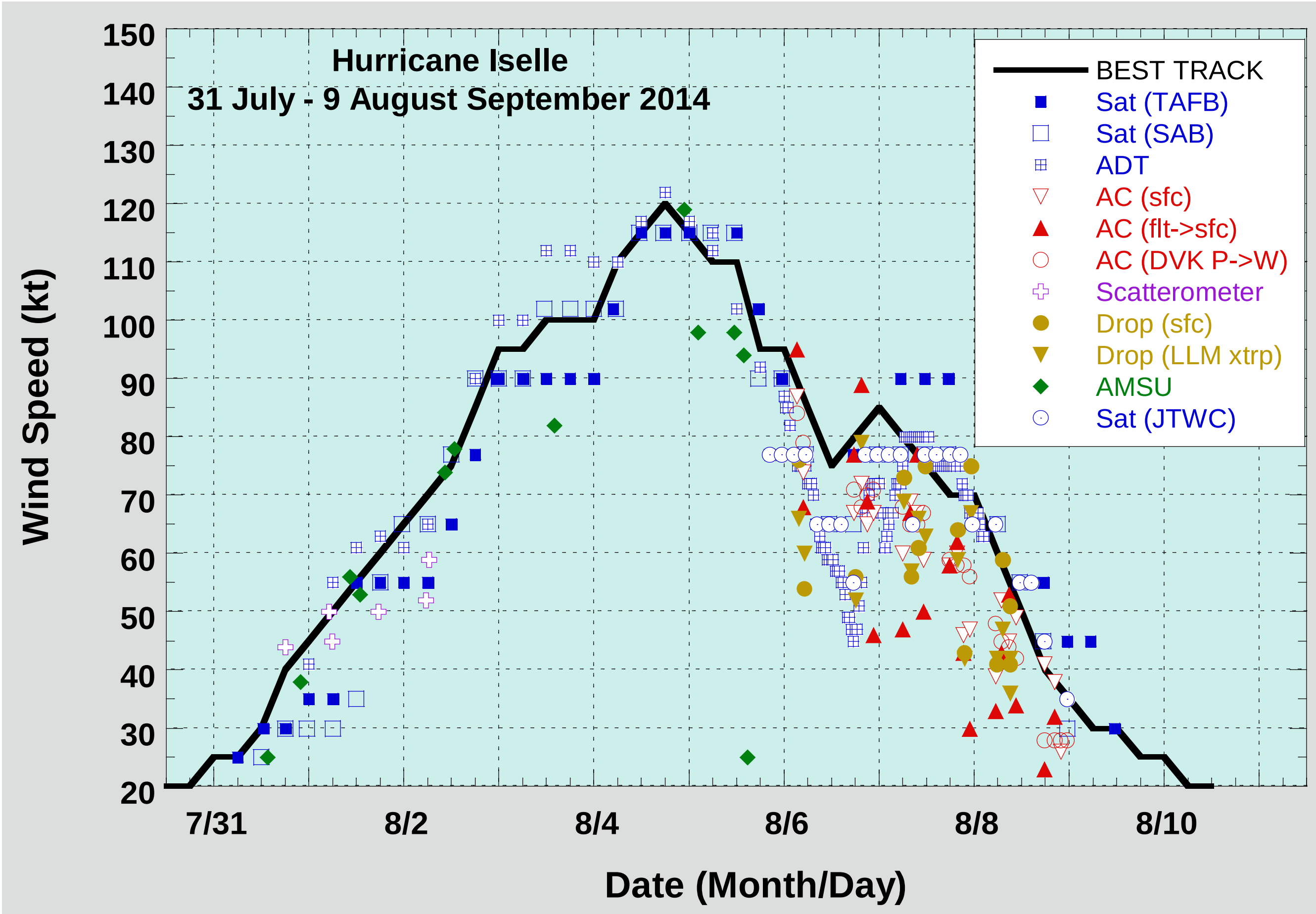

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Iselle, 31 July – 9 August, 2014. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique.

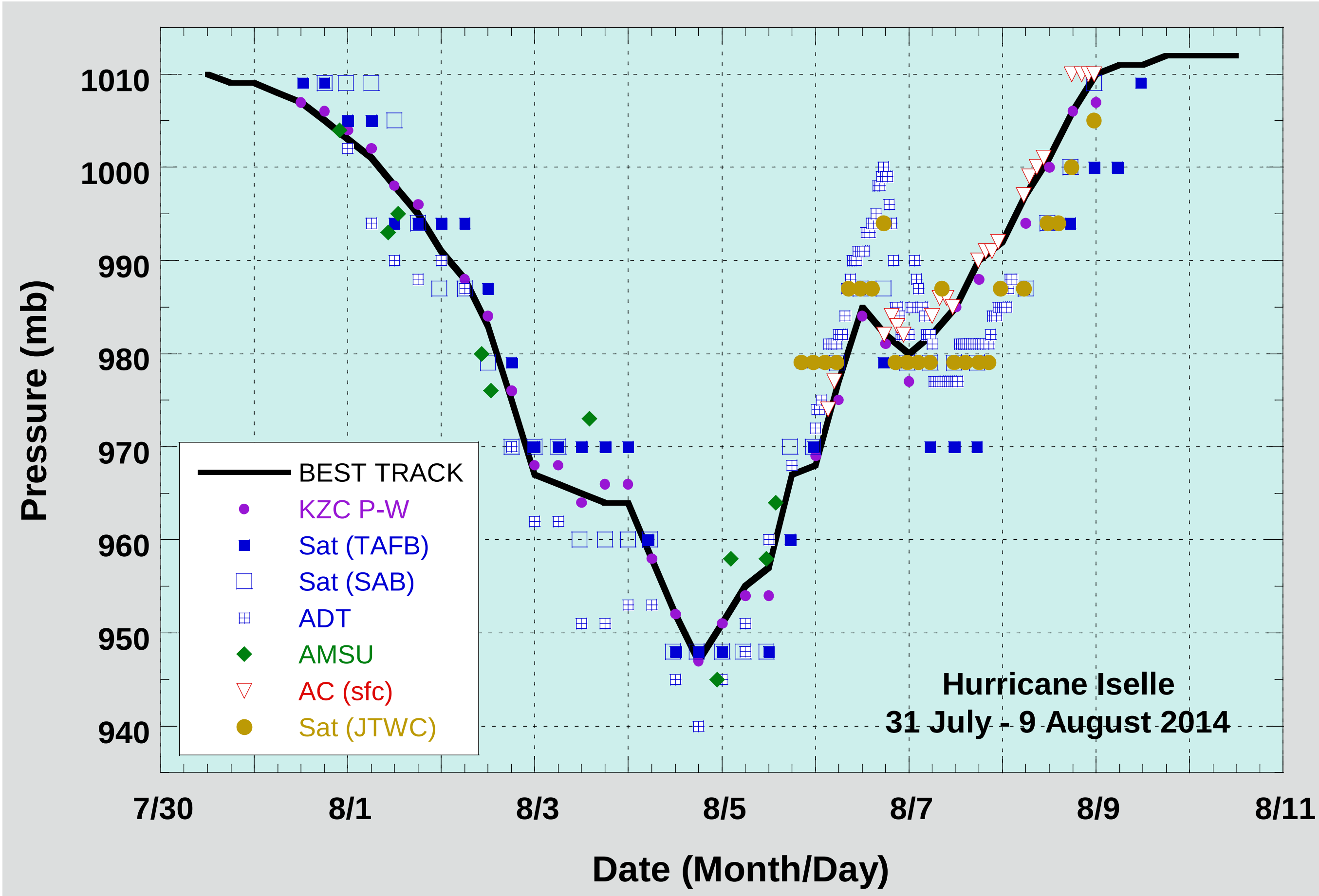

Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Iselle, 31 July – August 9, 2014. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship.

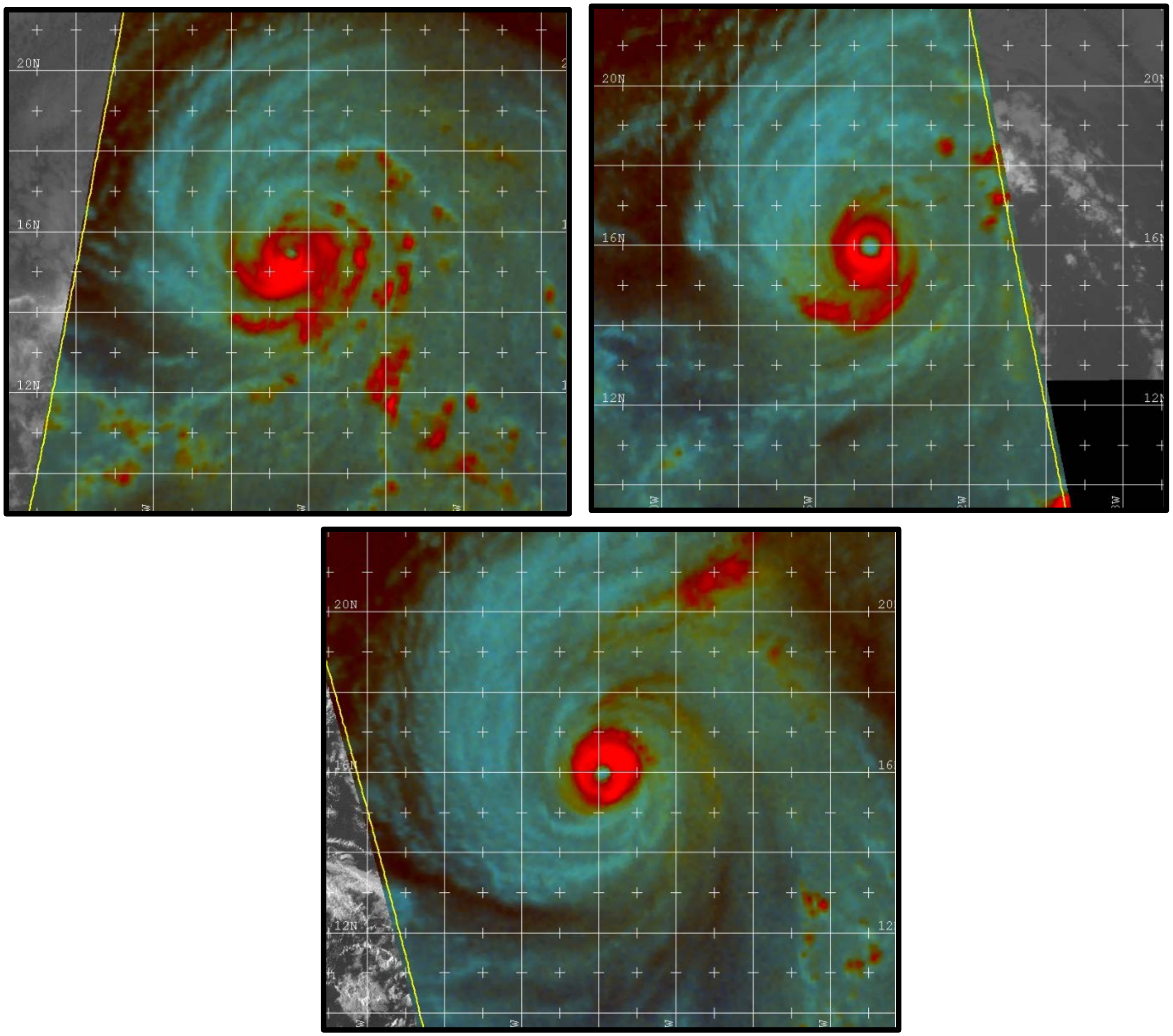

Figure 4. Series of 91-GHz SSMI/S images from 3 to 5 August 2014, showing the evolution of Iselle's inner core structure. Images courtesy of the Naval Research Lab.