# ICYCLONE CHASE REPORT

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| **storm** | **Hurricane NICOLE** | | |
| **location** | **Florida's Treasure Coast, USA** | | |
| **date** | **09-10 November 2022** | | |
| **chasers** | **Josh Morgerman** | **author** | **Josh Morgerman** |

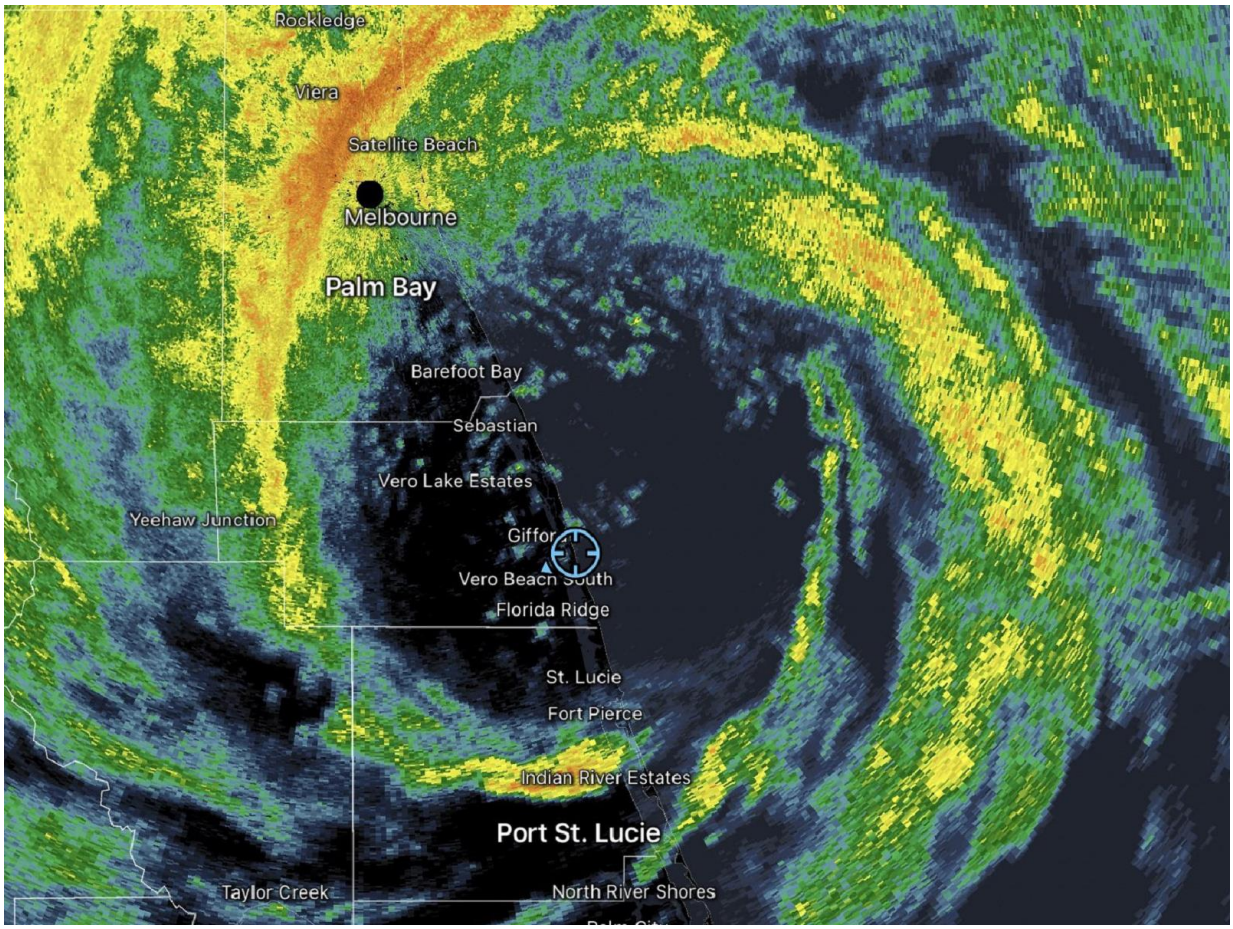
# Overview

**Hurricane NICOLE** struck the Treasure Coast of Florida on the night of 09-10 November 2022.

The author was in the landfall zone to observe the cyclone's passage in Stuart, nearby Jensen Beach, and in Vero Beach on North Hutchinson Island.

**Highlights:**

- NICOLE had a **large eye** that covered a wide swath of coast. The author observed the moon and dead-calm conditions near the center of the eye in Vero Beach on North Hutchinson Island.
- The author deployed two sensors in **Stuart (27.2194N 80.2629W).** One measured a **minimum sea-level pressure** of **985.6 mb at 1:50 am EST (0650Z),** at the SW edge of the eye.
- **Impacts** were mild in the landfall zone, including minor storm surge inundation on the immediate coast (observed in Jensen Beach), some flooded roads, and some downed signs and tree branches. (However, storm surge impacts were significant much further N, far from the landfall point—in St. Johns, Flagler, and Volusia Counties.)




***Radar shot from 3:04 am EST, as Hurricane NICOLE made landfall. The author was in Vero Beach (blue locator) at this moment, near the exact center of the eye. (Image: RadarScope)***

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# Locations

The author observed **Hurricane NICOLE's** landfall at multiple locations on Florida's Treasure Coast.

## Sensor Location A—Stuart

Before NICOLE struck, the author deployed two sensors in a hotel in **Stuart—**at **27.2194N 80.2629W.** This location was at the SW edge of the hurricane's large eye, ~14 n mi SW of the center (at its point of closest approach around 2 am EST) and ~20 n mi S of the landfall point.

## Chase Location B—Jensen Beach

The author reached **Jensen Beach** just after 9 pm EST, positioning in a waterfront parking lot next to the US Sailing Center of Martin County **(27.2296N 80.2162W).** The author observed the front eyewall of the hurricane here, departing (to head further up the coast) just before 2 am, when the SW edge of the eye hovered over this location.

## Chase Location C—Vero Beach, North Hutchinson Island

Between 2 and 3 am EST, while inside the hurricane's eye, the author drove N, up the coast, from Jensen Beach. Just after 3 am, he crossed the Merrill P. Barber Bridge to arrive in **Vero Beach on North Hutchinson Island,** stopping where Beachland Boulevard hits the water **(27.6534N 80.3560W).** This is almost exactly at the hurricane's landfall point (per the National Hurricane Center's 3 am EST advisory).

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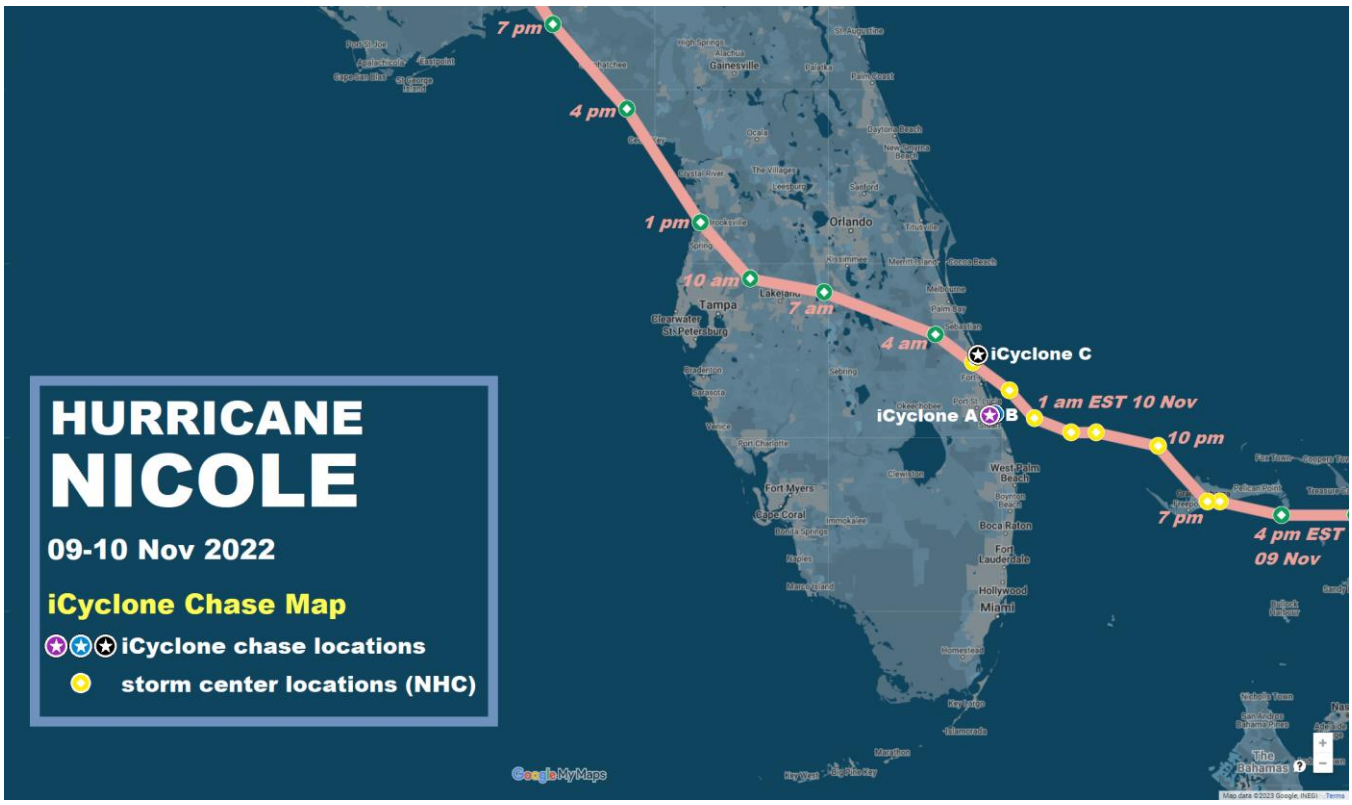
**Figure 1** shows the hurricane's track at landfall. **Figure 2** is a zoomed-in view. The **Chase Locations (A, B, and C)** are marked with **purple, blue,** and **black** stars.

### Figure 1: Chase Map

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## Figure 2: Chase Map (Close)

# Ground Observations

The author observed the passage of Hurricane NICOLE at multiple locations along Florida's Treasure Coast:

- **Jensen Beach.** ~9 pm to 2 am EST
- **Highway 1 (in Martin, St. Lucie, & Indian River Counties).** ~2 to 3 am EST
- **Vero Beach (North Hutchinson Island).** ~3 to 5 am EST

Ground observations in each location:

## Jensen Beach (Location B) (~9 pm to 2 am EST)

The hurricane approached slowly, bring several hours of heavy rains and strong winds.

Radar images suggest the eyewall reached this location at ~11:30 pm, however winds did not seem to significantly increase with the arrival of the hurricane's core. The winds felled a stop sign and tore some branches from trees. Rainfall flooded some streets and intersections. Storm surge inundated immediate coastal areas, overtaking the piers and coming well up onto the grounds and parking lot next to the US Sailing Center.

Radar images show this location cleared the inner eyewall and got into the SW edge of the eye around 1 am. There was an extended period of calming, with periods of light rain or no rain. At ~1:55 am—with conditions still relatively calm—the author noted a wind shift.

## Highway 1 (~2 to 3 am EST)

The author drove N on Highway 1 while inside the eye of the hurricane, aiming for the exact center. Conditions were relatively calm along the way, with mostly light rain. In St. Lucie at 2:48 am, near the center of the eye, the author noted the road was dry—evidence of an extended lull.

## Vero Beach (Location C) (~3 to 5 am EST)

The author crossed over the Merrill P. Barber Bridge and arrived in the heart of Vero Beach, on North Hutchinson Island, just after 3 am. At this point, almost the exact center of the eye was over the city.

Video clips from 3:11 to 3:22 am show dead calm conditions and no rain. The moon was visible through a thin layer of mist. Winds started to pick up again—and rain returned—at about 3:32 am, as the fragmented back eyewall approached. However, the hurricane's backside was mild—just windy, rainy conditions.

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Hurricane NICOLE's impacts across the landfall zone—Florida's Treasure Coast—appeared mild.

Except for some downed tree branches and signs, the author did not see any significant wind damage. Power appeared to stay on across most of the region, with gas stations and convenience stores along Highway 1 remaining open during the storm.

While a destructive storm surge occurred further N—in St. Johns, Flagler, and Volusia Counties—the author did not observe significant storm surge impacts on the Treasure Coast.

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## Figure 3: Vero Beach—3:15 am EST

***Near the center of Hurricane NICOLE's eye in Vero Beach, the moon was visible through a thin layer of mist. Conditions in the city were dead calm at this time.***

# Air Pressure Data

The author collected quality-controlled air-pressure data at **Location A** (Stuart: 27.2194N 80.2629W).

Two Kestrel 4500s were left undisturbed on the bathroom counter of the author's second-floor hotel room during the entire passage of the hurricane.

The sampling rate for both devices was one reading per 30 seconds (2/min).

## Calibration

An elevation app indicated the ground elevation at this location is **9 ft.** This value seemed reasonable to the author, given the hotel's proximity to the water and the flat terrain.

To calibrate the device, the author used a reference altitude of **26 ft**—which is the assumed ground elevation (9 ft) plus additional altitude to account for being on a countertop on the hotel's second floor.

## Minimums

**Devices 1 and 2** matched fairly well, showing minimum values within 1 mb of each other:

- **Device 1: 985.6 mb at 1:50 am EST (0650Z)**
- **Device 2: 986.5 mb at 2:05 am EST (0705Z)**

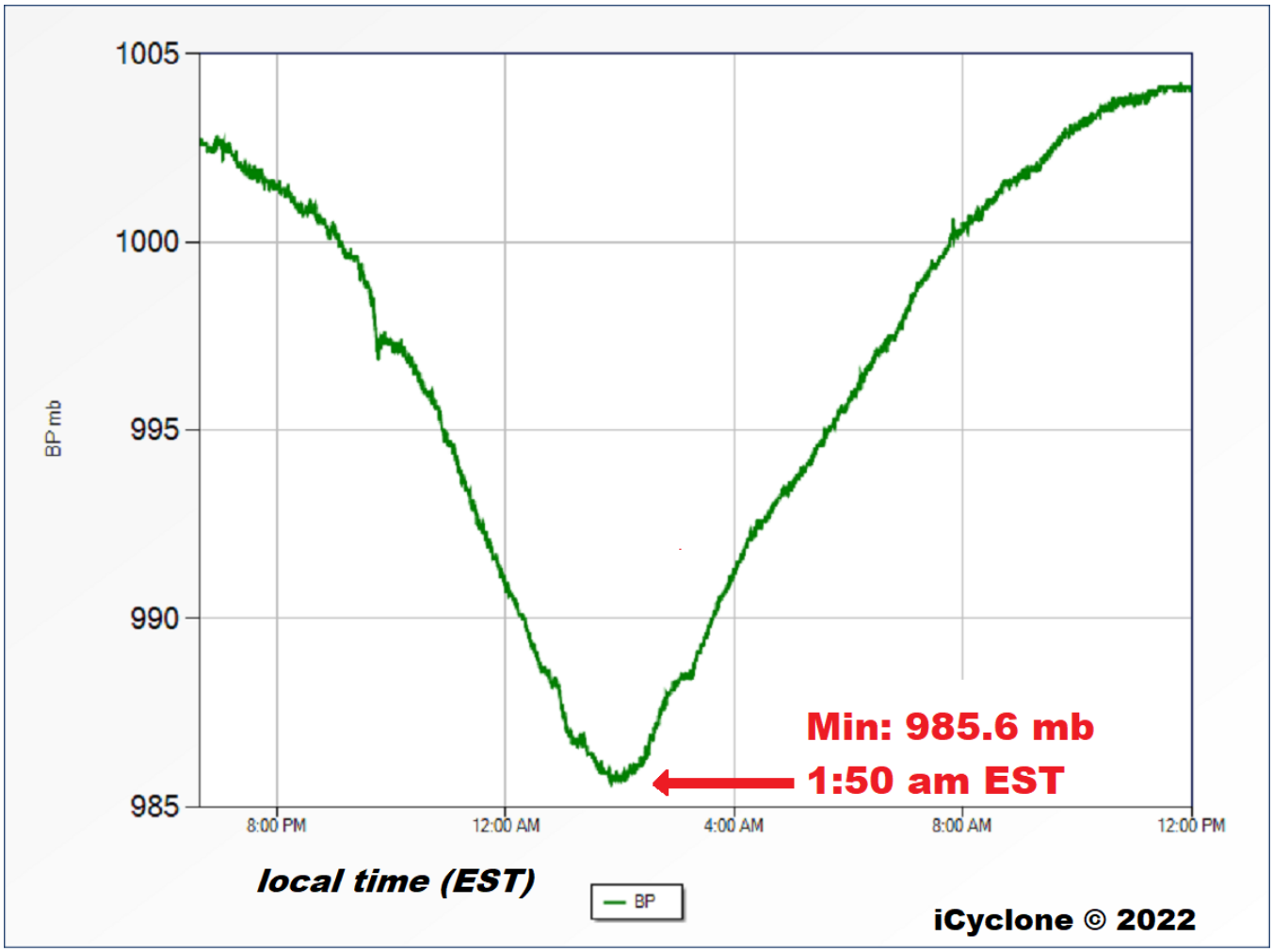
The complete data are graphed in **Figures 4** and **5,** below.

Both graphs show the standard V-shaped pressure trace one expects from a passing hurricane. Interestingly, both graphs show an odd perturbation—an irregular, sharp dip—during the 10 minutes leading up to around 9:45 pm EST. The author was not at this location when this plunge occurred and doesn't know what caused it—however, radar images show a vigorous rainband passing over the area at that time (see **Figure 6**).

Not surprisingly, both devices recorded their minimum pressures when the SW edge of the eye was passing over this location (see **Figure 7**)—and when the hurricane's center was at its point of closest approach, ~14 n mi to the NE.

## Figure 4: Barogram—Device 1

***The minimum value of 985.6 mb occurred at 1:50 am EST (0650Z). At this time, the SW edge of the eye was passing over this location, and the hurricane's center was at its points of closest approach.***



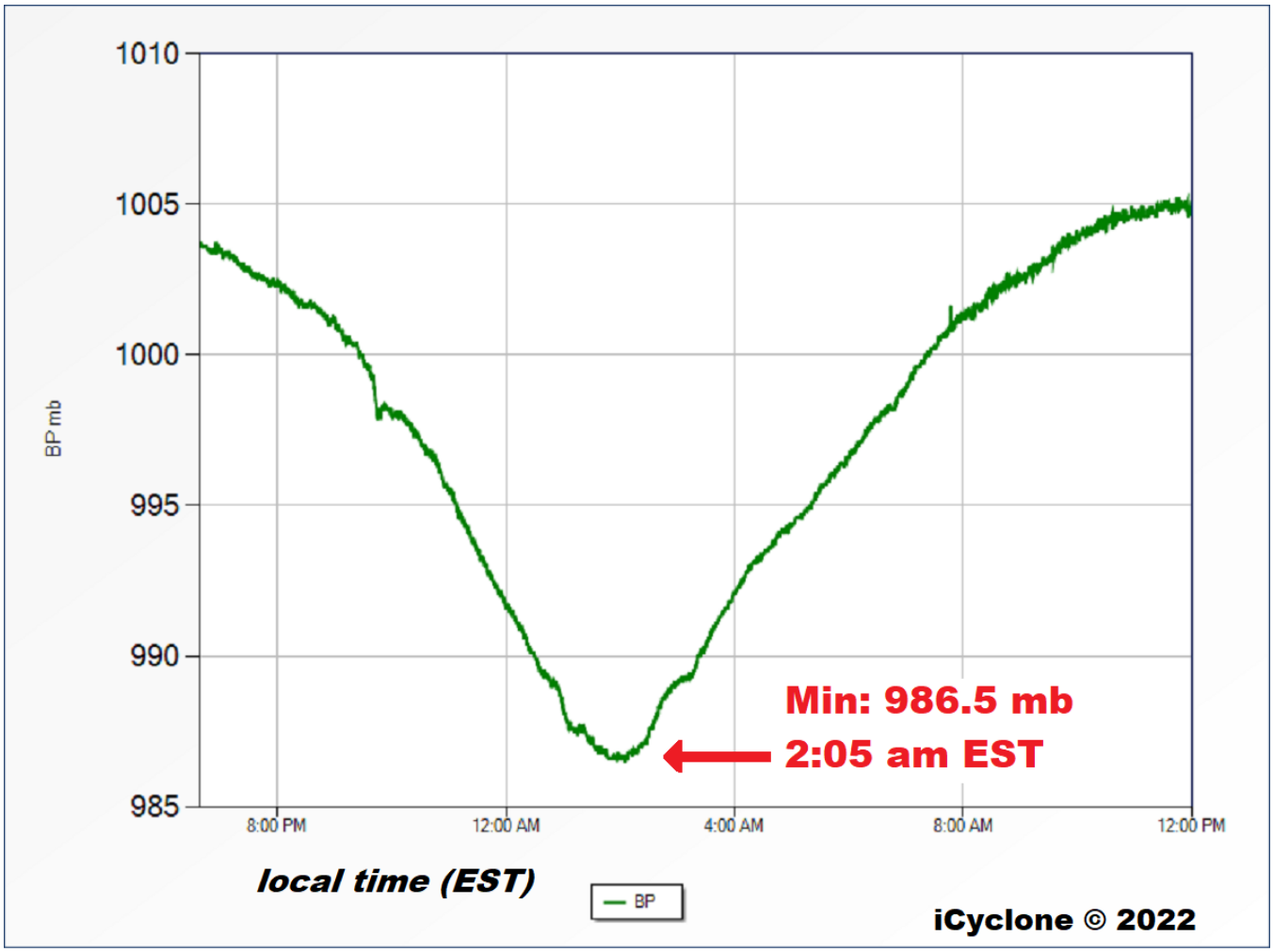

**HURRICANE NICOLE: 09-10 Nov 2022**

**Stuart, Florida, USA**

**27.2194N 80.2629W – ref el 9 ft** **DEVICE 1**

## Figure 5: Barogram—Device 2

***The pressure profile for Device 2 is similar to what's shown for Device 1. The difference between the two minimums (0.9 mb) falls within the accuracy range of the devices and is not considered significant.***



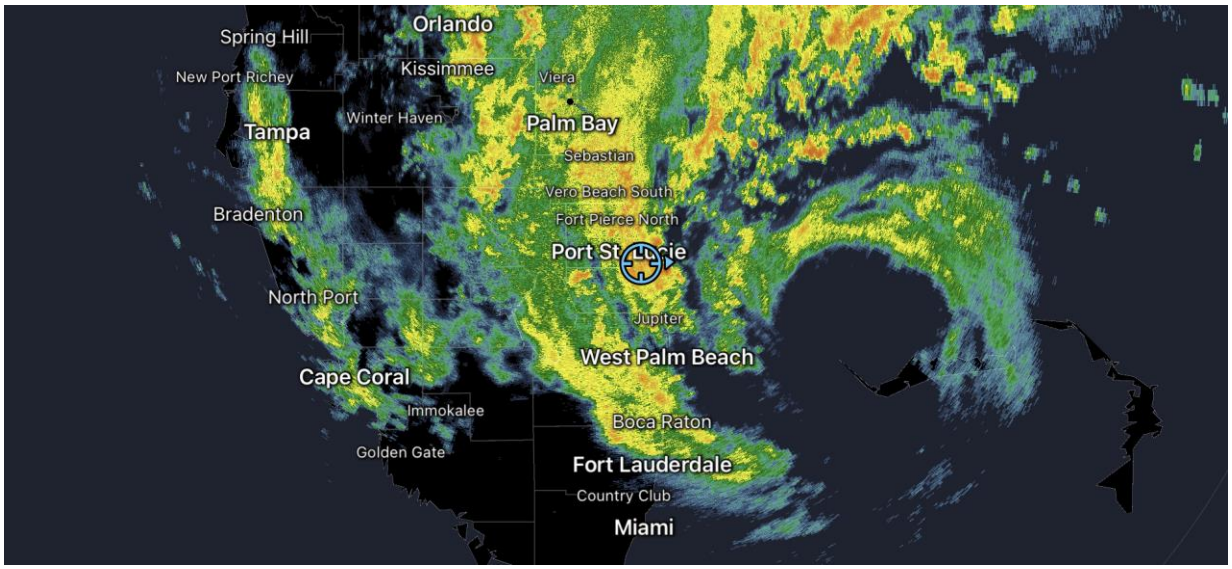

**HURRICANE NICOLE: 09-10 Nov 2022**

**Stuart, Florida, USA**

**27.2194N 80.2629W – ref el 9 ft** **DEVICE 2**

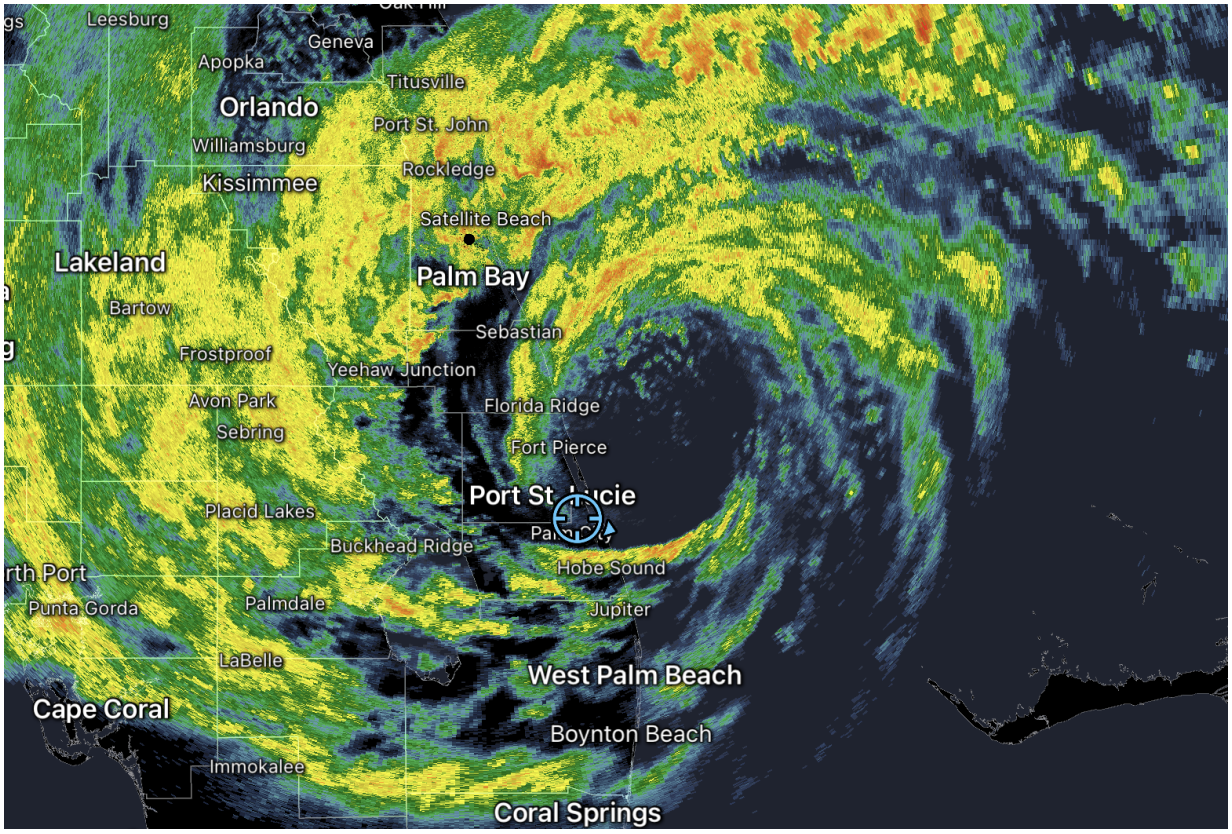
## Figure 6: Radar—9:31 pm EST

***Radar from 9:31 pm EST shows a strong rainband passing over Stuart near the time of the sharp dip noted in the air-pressure data. (The devices that recorded the data were near the blue locator symbol—about 2.6 n mi to the WSW.) (Image: RadarScope)***




## Figure 7: Radar—1:50 am EST

***Radar from 1:50 am EST, when the lowest pressure was recorded in Stuart. The SW edge of the eye was passing over the observation point (marked with the blue locator symbol) and the hurricane's center was at its point of closest approach. (Image: RadarScope)***



# Questions or Feedback?

Get in touch:

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