

# iCYCLONE CHASE REPORT

storm	Hurricane LISA		
location	Belize City, Belize		
date	02 November 2022		
chasers	Josh Morgerman	author	Josh Morgerman

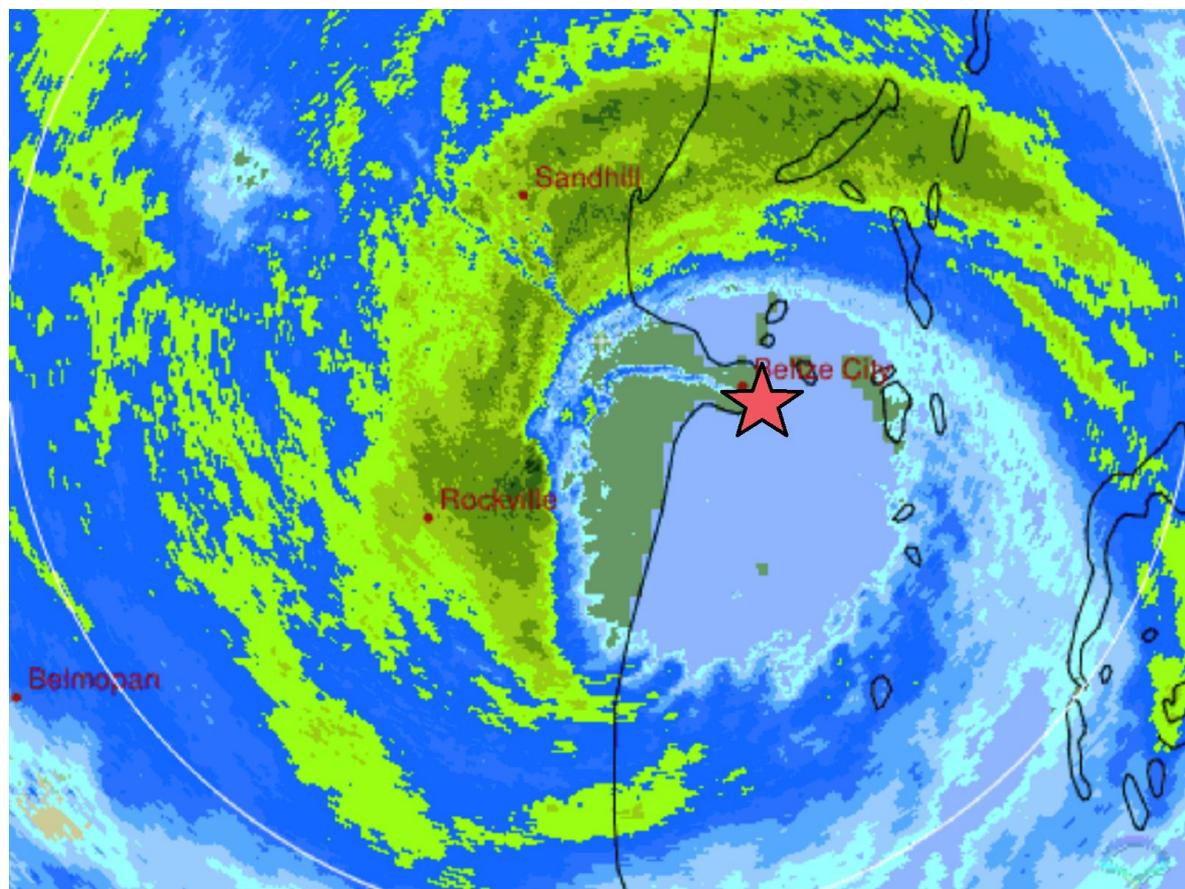
## Overview

Hurricane LISA was a late-season Category-1 hurricane that struck the Caribbean nation of Belize on the afternoon of 02 November 2022.

The author was in **Belize City** (17.4903N 88.1870W), very near the landfall point, to collect data and document the impact.

### Highlights:

- **Location.** The author's location was ~5 n mi N of the path of LISA's center. The hurricane's large eye passed over this point from ~2:30 to 4:20 pm CST.
- **Minimum Pressure.** The minimum sea-level pressure at this location was **986.9 mb at 3:34 pm CST (2134Z) 02 November**—measured in the hurricane's eye.
- **Impact.** LISA had a significant impact on Belize City. There was widespread wind damage across the city, and a fast-moving, destructive storm surge—apparently peaking at ~6 ft above normal—inundated much of the Downtown area during and after the eye.



*Radar shot showing the eye of Hurricane LISA passing over Belize City, Belize. The red star indicates the author's location. (Image: Belize National Meteorological Service)*

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## Location

The author observed the passage of **Hurricane LISA** in **Belize City, Belize**.

**Data** were collected at **17.4903N 88.1870W**. This is the Coningsby Inn, on Regent Street, one block from the waterfront. In addition to collecting data, the author made **observations** at this and other nearby locations around Downtown (on the city's South Side).

Per National Hurricane Center advisory positions, this location was very close to LISA's track—about **5 n mi N of the center** (at its point of closest approach).

The author arrived at this location ~2.5 hours before the center's closest approach, remaining there until long after the cyclone had passed.

**Figure 1** shows the chase location (red star) in relation to **LISA's center** (yellow points), per NHC advisory positions. (**Figure 2** is a closer view.)

**Figure 1: Chase Map**



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Figure 2: Chase Map (Close)



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## Key Observations

The center of LISA passed ~5 n mi S of Belize City at ~3 pm CST (4 pm CDT), making landfall about 20 minutes later. This was close enough to put the city squarely inside the hurricane’s generous eye for almost two hours.

Following are key observations. All times are **CST (local time)**. (Please note this is one hour earlier than NHC advisory times, which were CDT.)

### Peak Winds

As the hurricane approached Belize City, strong winds and heavy rain began in earnest in Downtown a little after 1 pm CST.

Conditions gradually deteriorated from there, with the apparent peak winds and heaviest rain occurring from **~2:00 to 2:10 pm**. A radar image from around this time suggests these peak winds coincided with the inner edge of the hurricane’s eyewall. (See **Figure 3**.)

The author noticed distinct calming—and much lighter rain—by ~2:15 pm.

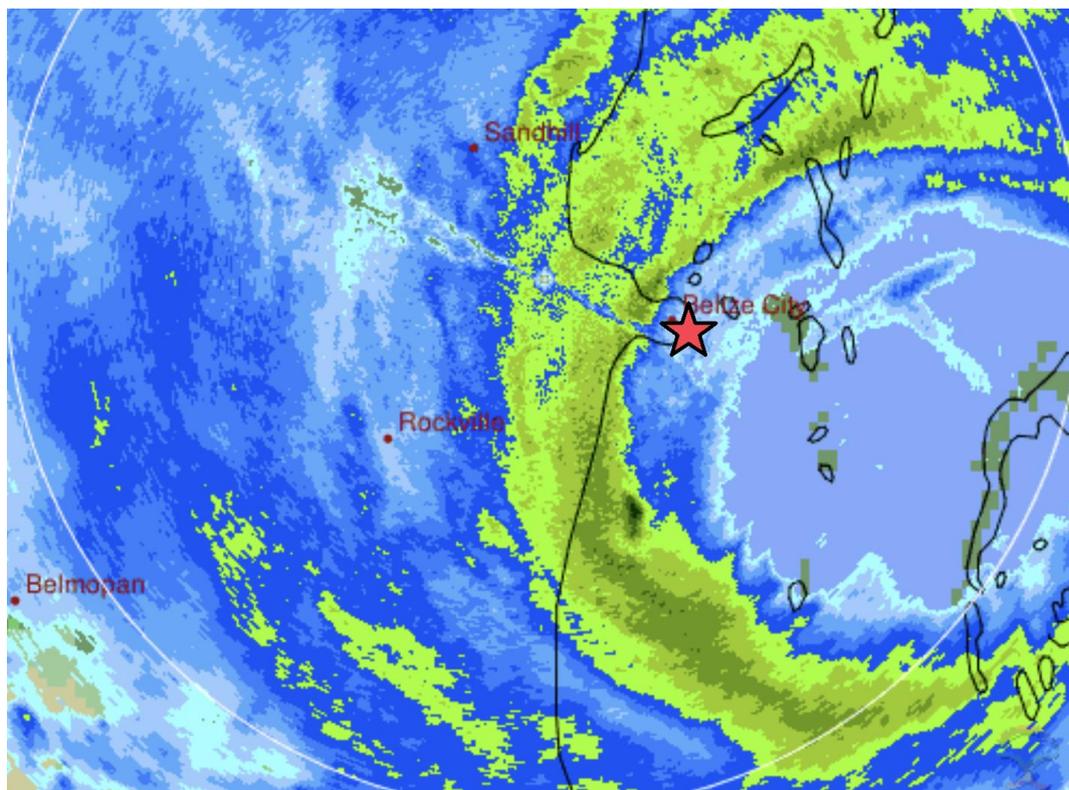
### Eye

Based on radar imagery, the eye passed over Belize City from approximately **2:30 to 4:20 pm CST**.

While the eye was distinct on radar, it was not as well-defined on the ground: it was cloud-filled and turbulent, with periods of rain and strong winds. The author doesn’t recall any moments of true calm.

### **Figure 3: Hurricane’s Inner Eyewall Clearing Belize City**

*This radar shot shows LISA’s inner eyewall just clearing Belize City (red star) at 2:08 pm CST 02 Nov 2022. The author noted the apparent peak winds occurred in the city at about this time. (Image: Belize National Meteorological Service)*



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## Storm Surge

LISA's storm surge came rushing into Belize City with great suddenness during the eye. **The catalyst seemed to be a shift in wind direction**—to onshore—just before 3 pm CST, in the eye.

Fast-moving and aggressive, the surge overtopped the seawall around 3:40 pm and inundated most of the Downtown area (on the city's South Side) in a matter of minutes. At its peak, the inundation in most places seemed to be ~2 ft to as high as ~3 ft above ground level, suggesting the storm surge was **~6 ft above normal**. The peak inundation was short-lived, lasting maybe an hour or two before the surge rapidly pulled back out into the Caribbean.

Following is a chronology of this inundation event, reconstructed from time-coded video footage. The important wind shift is **coded red** and the period of serious Downtown inundation is **coded purple**:

- **1:10 pm.** On waterfront on City's South Side, winds NNW to NNE (**ranging from just offshore to parallel to coast**). Sea windswept with some blowing spray, but relatively smooth—not many whitecaps.
- **2:00 – 2:10 pm.** Apparent peak winds occur.
- **2:15 pm.** Calmer. Some storm surge flooding on a couple of blocks near immediate coast, but waterfront road (Southern Foreshore) and most of Downtown still above water. Winds essentially NNE, roughly parallel to coast. Seas rippling—but no waves or whitecaps.
- **2:25 pm.** Winds still NNE, parallel to coast—but **stronger**. Whitecaps and lots of blowing spray.
- **2:55 pm.** Winds have **shifted**—now NE to ENE **and onshore**. Sea much more turbulent. **Waves slamming up against seawall, some coming over wall and spilling onto waterfront road.**
- **3:00 – 3:20 pm.** Sky brightening. Winds NE to ENE. Large waves frequently breaking over seawall and onto waterfront road.
- **3:25 pm.** Author retreats one block inland, to his hotel on Regent Street.
- **3:40 pm (estimated).** Storm surge overtops seawall.
- **3:45 pm.** Storm surge races into neighborhood, surrounding hotel and author's car on Regent Street in matter of minutes. *(This suggests surge topped seawall a few minutes before—likely around 3:40 pm.)*
- **3:52 pm.** Author drives a couple of blocks inland as nearby streets and alleyways are submerged.
- **4:15 pm (or possibly earlier).** Much of Downtown inundated several blocks inland, with most streets under 2 ft—to as much as 3 ft—of water.
- **5:15 pm.** Water in Downtown no longer rising—has apparently peaked.
- **5:35 pm.** Water apparently receding, as some sidewalks that had been submerged are visible again.
- **8:10 pm.** Water has significantly receded from Downtown streets.
- **8:55 pm.** Water has almost completely receded from Downtown, leaving streets covered in mud and sludge. Author able to drive back to his hotel on Regent Street, which had been under a couple of feet of water during peak inundation.

The following day, the author talked with residents in waterfront neighborhoods. Several of them also noted the suddenness and speed of the storm surge, with one man describing it as a “tsunami.”

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## Air Pressure Data

The author collected quality-controlled air-pressure data with three Kestrel 4500s.

The devices were left undisturbed on the bathroom counter of the author's first-floor hotel room during the entire passage of the hurricane. The room was inundated by the storm surge, but the devices were high enough to be unaffected.

The sampling rate for all devices was one reading **every 30 seconds (2/min)**.

### Calibration

The observation location was one block from the waterfront, so the author was able to visually estimate the elevation at **3 ft**.

To calibrate the device, the author used a reference altitude of 7 ft—which is the assumed ground elevation (3 ft) plus additional altitude to account for being on a countertop on the hotel's first floor.

### Minimums

The devices matched fairly well, showing minimum readings within ~1 mb and at approximately the same time as LISA's eye passed over the observation point:

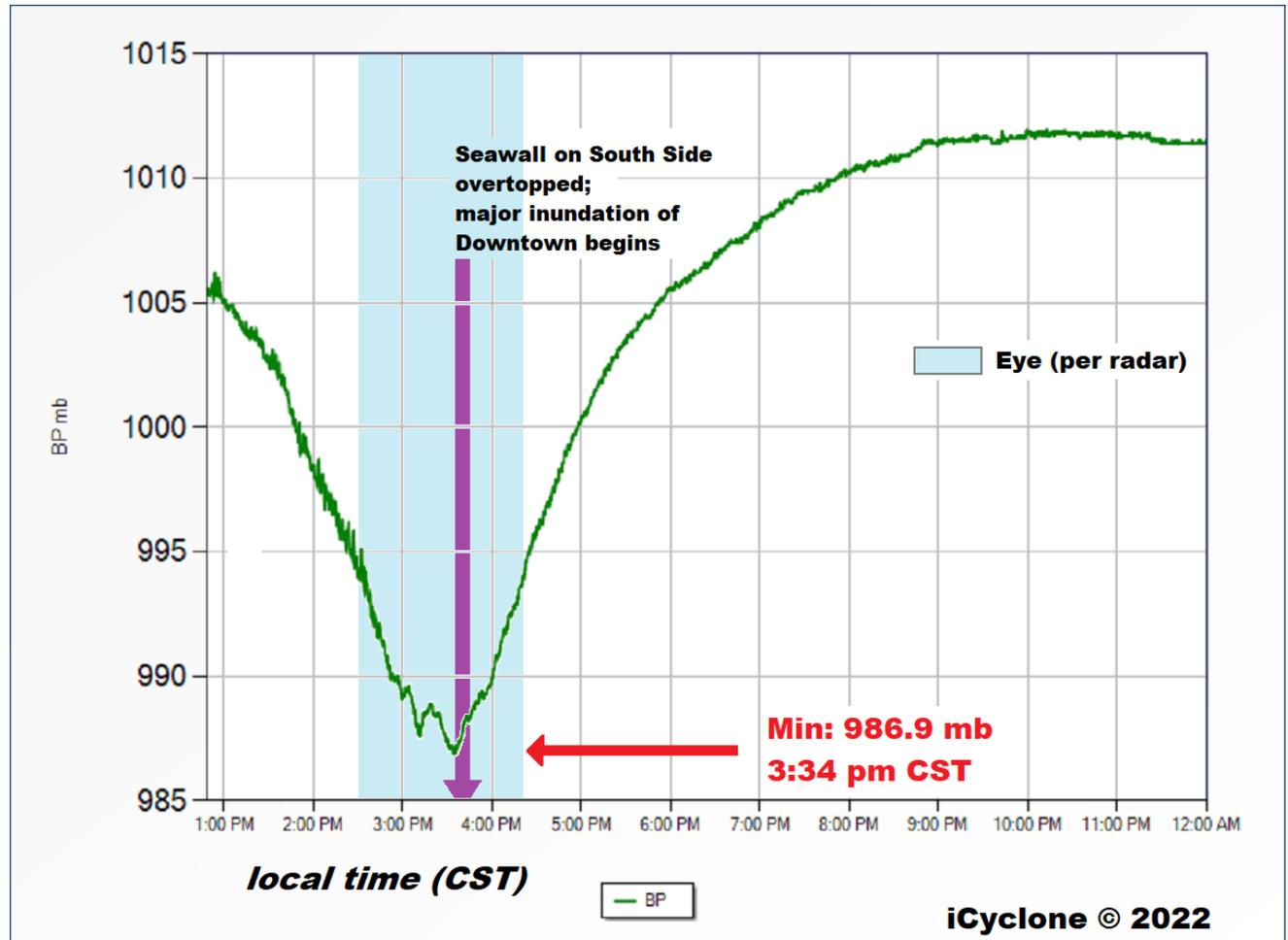
- **Device A: 986.9 mb at 3:34 pm CST (2134Z)**
- **Device B: 988.0 mb at 3:33 pm CST (2133Z)**
- **Device C: 987.7 mb at 3:34 & 3:35 pm CST (2134Z & 2135Z)**

The complete data are graphed in **Figures 4, 5, and 6**, below.

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**Figure 4: Barogram—Device A**

The air-pressure trace for Device A. The minimum value of 986.9 mb occurred at 3:34 pm CST (2134Z), as Hurricane LISA's eye passed over Belize City. Also indicated is the approximate time the storm surge overtopped the seawall and inundated Downtown.



## HURRICANE LISA: 02 Nov 2022

Belize City, Belize

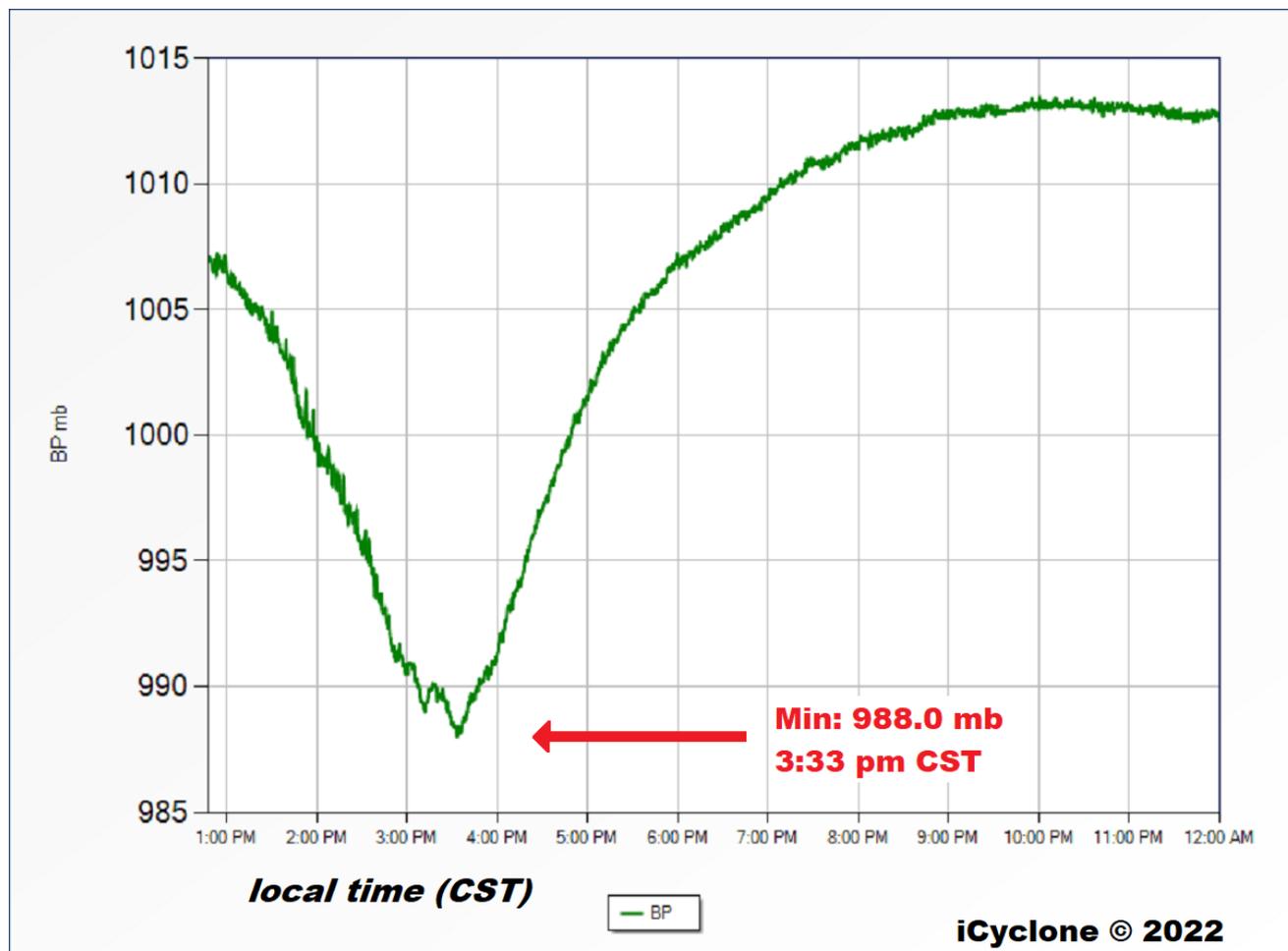
17.4903N 88.1870W – ref el 3 ft

**DEVICE A**

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Figure 5: Barogram—Device B

The pressure trace for Device B. The minimum of 988.0 mb occurred at 3:33 pm CST (2133Z), in LISA's eye.



## HURRICANE LISA: 02 Nov 2022

Belize City, Belize

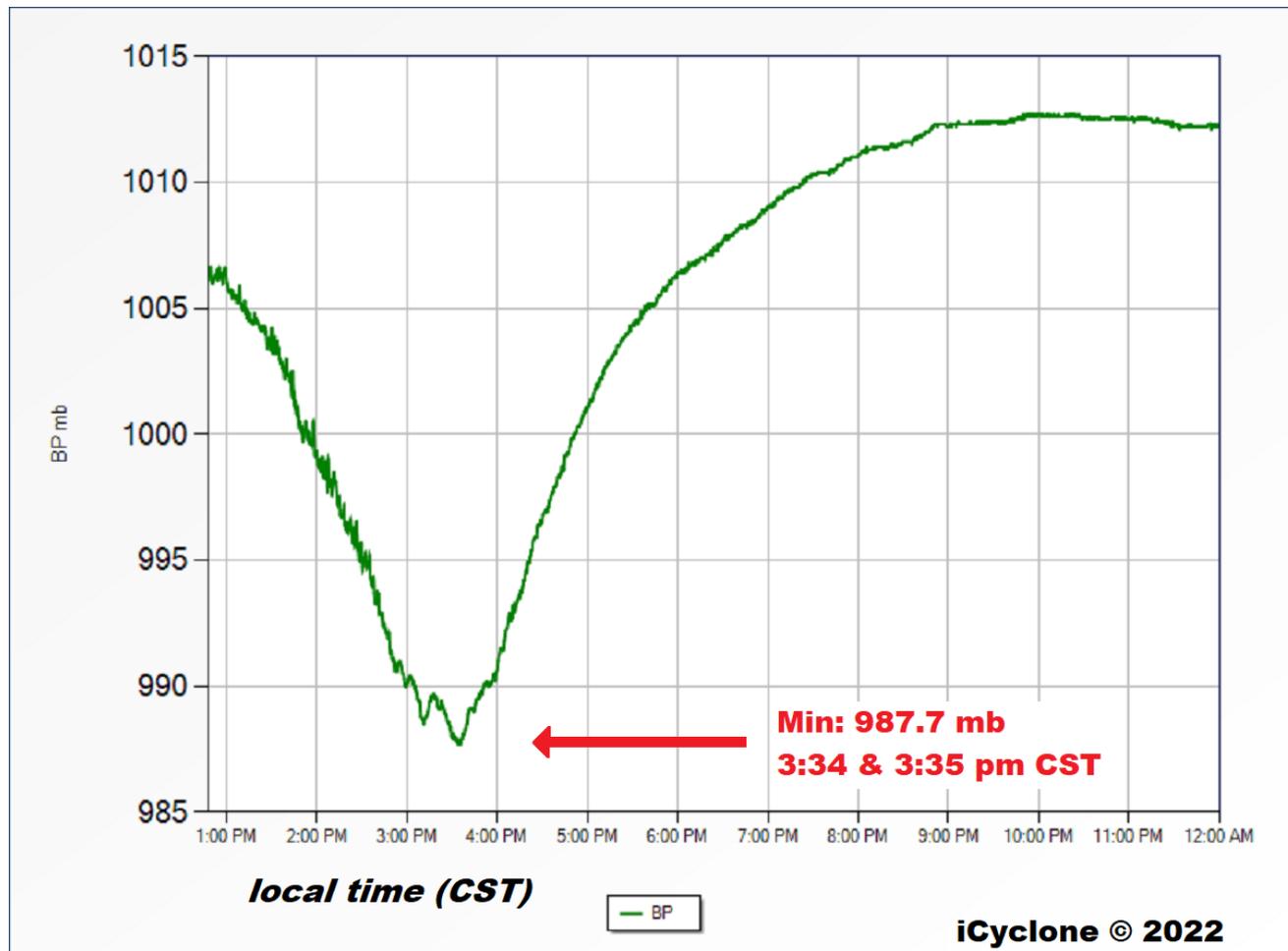
17.4903N 88.1870W – ref el 3 ft

**DEVICE B**

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**Figure 6: Barogram—Device C**

The pressure trace for Device C. The minimum of 987.7 mb occurred at 3:34 and 3:35 pm CST (2134Z and 2135Z), in LISA's eye.



## HURRICANE LISA: 02 Nov 2022

Belize City, Belize

17.4903N 88.1870W – ref el 3 ft

**DEVICE C**

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## Impact & Aftermath

Hurricane LISA significantly impacted Belize City, inflicting widespread wind and water damage.

The storm surge inundated much of Downtown on the city's South Side, flooding what seemed to be thousands of homes and businesses to a depth of 1-3 ft. Although the surge didn't remain on land for long, it left debris in the streets and a thick sludge everywhere—on streets and sidewalks and inside many homes and businesses.

Wind damage was extensive in the city's poorer neighborhoods, with less resistant structures—especially wood-frame ones—losing their roofs. Large trees and signs were felled. Sturdier homes and businesses in the Downtown area fared better, but there was still some roof damage, and a large communications tower near the author's hotel was destroyed—bent in half by the winds.

Much of the city was left without power, and crews worked hard to restore it. The author's Downtown hotel had power again the following evening—faster than expected. Mobile networks were also significantly impacted, so much of the city was without phone/data service the next day.



***Waves crashing against the seawall on the South Side of Belize City during Hurricane LISA. Shortly after this image was captured, the storm surge overtopped the seawall and rapidly inundated Downtown.***

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***The strongest winds—associated with the inner edge of the leading eyewall—raked Belize City just after 2 pm CST.***



***3:47 pm CST. At the intersection of Regent Street and Rectory Lane, looking toward the waterfront. Waves can be seen crashing over the seawall as storm surge rushes into the neighborhood.***

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***Storm surge flooding in Belize City during Hurricane LISA. The view is looking S, down Regent Street. The street was completely inundated at the height of the storm.***



***Storm surge flooding in Belize City during Hurricane LISA. The view is looking S, down Regent Street.***

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***Storm surge flooding in Belize City during Hurricane LISA. The view is looking S, down Regent Street.***



***Storm surge flooding in Belize City during Hurricane LISA. This time the view is looking N, up Regent Street.***

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***Storm surge flooding in Downtown Belize City during Hurricane LISA.***



***Storm surge flooding in Downtown Belize City during Hurricane LISA.***

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***Storm surge flooding in Downtown Belize City during Hurricane LISA.***



***Large felled tree in front of a church in Downtown Belize City, the day after Hurricane LISA. Wind damage across the city was streaky.***

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***A destroyed communications tower off Regent Street in Downtown Belize City. Hurricane LISA's winds bent the structure in half.***



***Destroyed sign at a major traffic roundabout in Downtown Belize City, the day after Hurricane LISA.***

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***A home with a destroyed second story in a poorer neighborhood in Belize City. Wood-frame structures with tin roofs were no match for Hurricane LISA's winds. Many such structures across the city were damaged.***



***Roof damage from inside a home in a poorer neighborhood in Belize City. Hurricane LISA's winds destroyed many such roofs (with tin surfacing) across the city.***

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***A resident of Belize City shows the damage to her home. Hurricane LISA's winds tore off the roof and scattered the debris in the trees.***



***A resident of a waterfront family compound in Belize City describes how Hurricane LISA's storm surge swept ashore fast and struck the house below with "full impact." He added, "It was like a tsunami."***

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***A resident of a waterfront family compound in Belize City shows Hurricane LISA's damage and describes how it happened.***



***Hurricane LISA's winds tore the roof off this small restaurant/food stand in Belize City. Damage such as this was especially unfortunate, as it also impacted people's livelihoods.***

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*View from inside a damaged home in Belize City. Hurricane LISA's winds tore off most of the roof, exposing the inside to the elements.*



*Members of an extended family survey the damage to their family compound in Belize City. Hurricane LISA's storm surge scattered wreckage across their property and into the street.*

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***Debris and wreckage litter a street in Belize City the day after Hurricane LISA. The storm surge left a tremendous mess across the city.***



***The flimsy structure in the background was no match for LISA. The hurricane's winds knocked it askew and scattered the debris.***

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## Video

The passage of Hurricane LISA in Belize City—as described in this report—will be documented in an upcoming video on the author's YouTube channel: <https://www.youtube.com/icyclone>.

For easy analysis, all the footage will be timestamped in local time (CST).

## Questions or Feedback?

Get in touch:

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