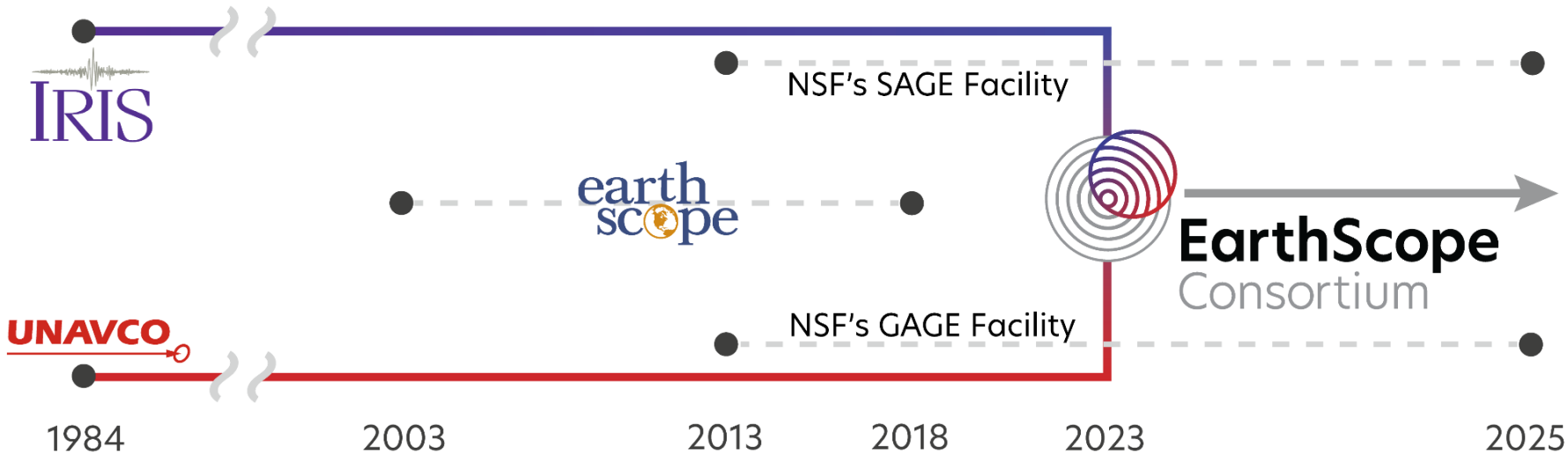
EarthScope Support for the ICG/CARIBE-EWS 2025

Annie Zaino, Dan McNamara

EarthScope Instrumentation Services

May 5-9, 2025

Background



Organization

- IRIS/UNAVCO/sub-awards merged
- Instrumentation Services
- Data Services
- Engagement
- Accounting and Human Resources

NSF National Geophysical Facility

- Proposal submitted June 2024
- New funding cycle begins October 2025
- Funding for 5-10 years
- Performance review after 5 years
- Funding review still in process

Instrumentation Services Update

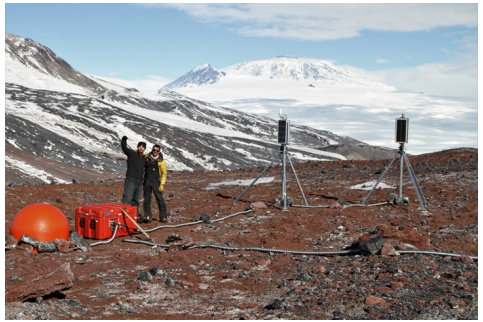
GAGE SAGE
Operated by EarthScope Consortium

Seismic Network operations

- Real-time and non real-time
  - **Global Seismograph Network** (GSN)
  - Portable Program (PASSCAL)
  - Polar Program
    - Mt Erebus Volcano
    - ANET

Geodetic Network operations

- Real-time and non real-time
  - **Network of the Americas** (NOTA)
  - **NASA Global GNSS Network** (GGN)
  - GNSS campaigns



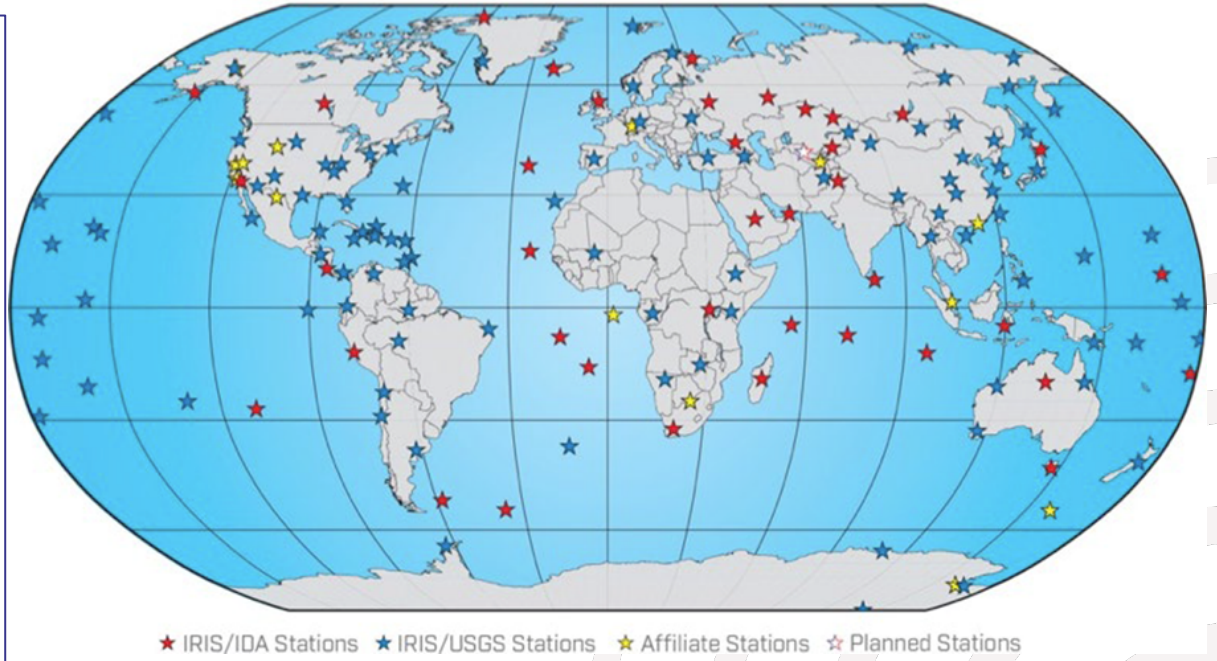
Global Seismographic Network

~160 real-time seismic stations operated by the USGS and NSF (EarthScope)

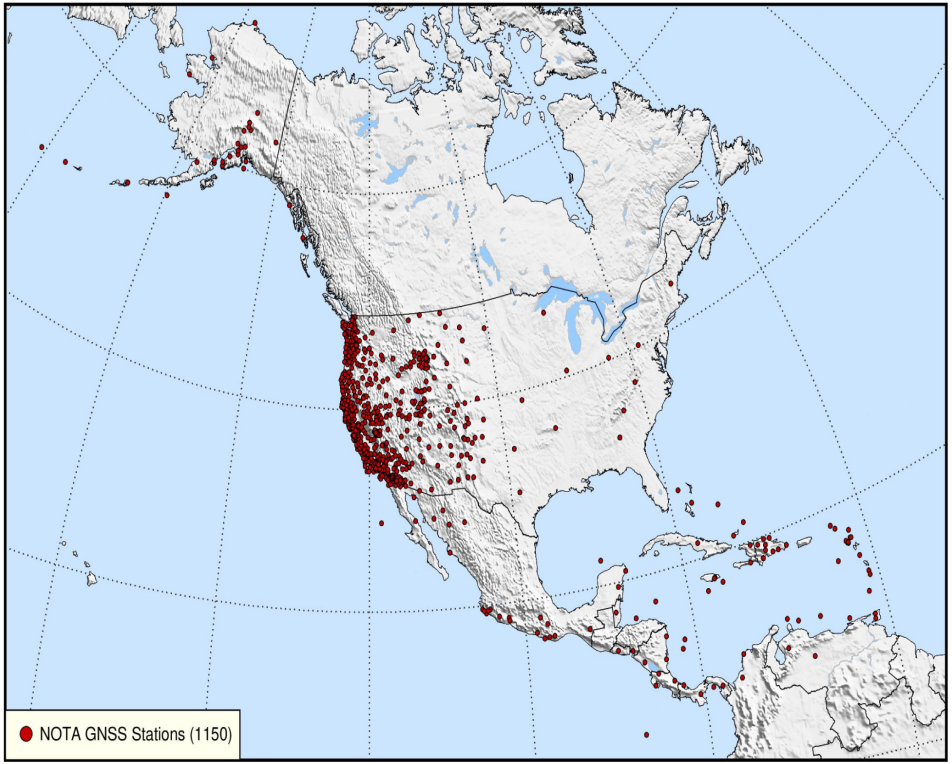
Real-time data streams used by NOAA TWCs for earthquake monitoring

October 2024 – Operations of the NSF GSN transferred from IRIS/IDA to EarthScope

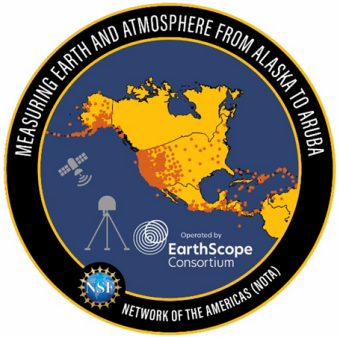
Improving collaboration with USGS to standardize instrumentation and power systems across the GSN



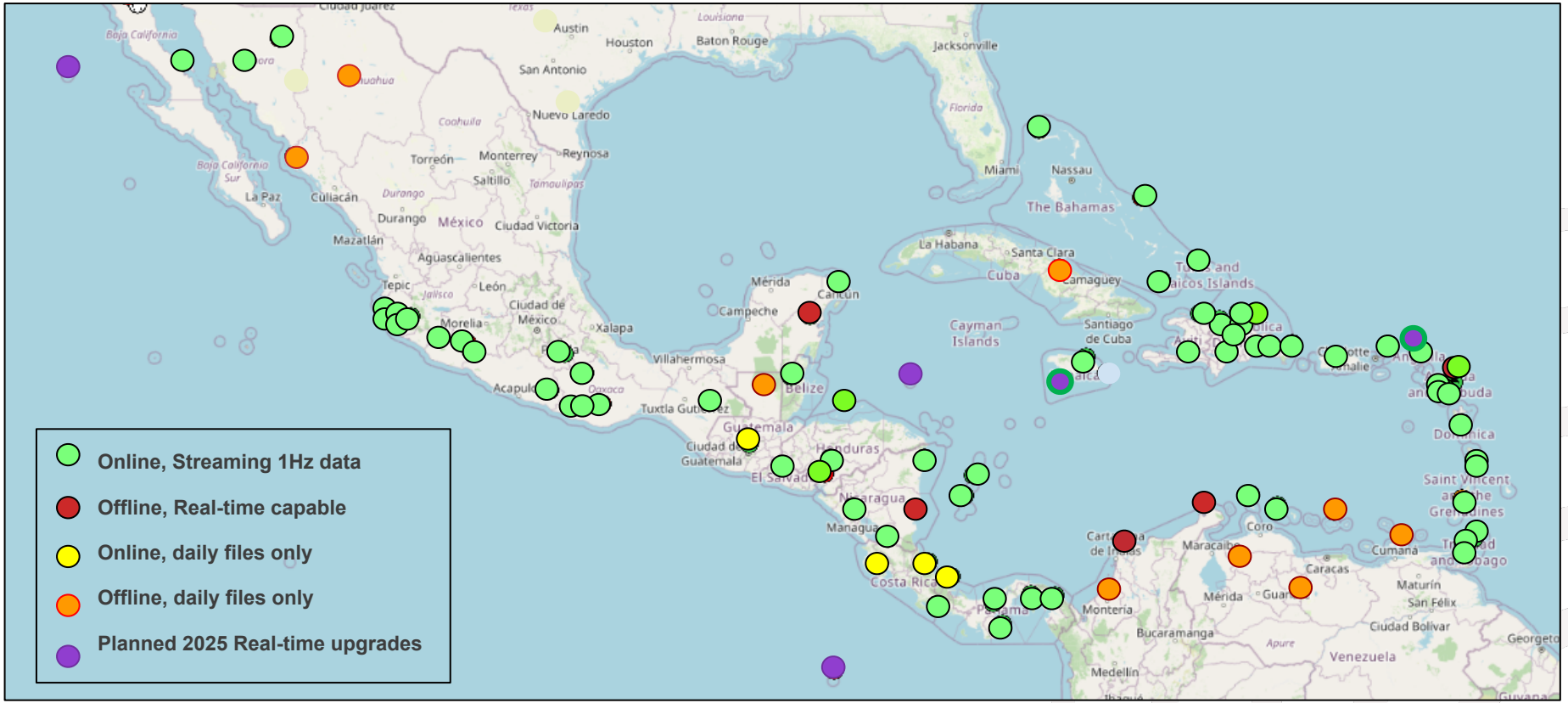
Network of the Americas (NOTA)



- Network of 1150 GNSS Stations
- borehole seismometer/strainmeters
- meteorological equipment the Caribbean and Central America
- Current NSF funding for repairs, upgrades, engineering support, data archiving
- Majority of stations are full GNSS
- In the process of upgrading to 1Hz realtime data where communications supports it
- Earthquake response or by special request: high rate downloads of 5Hz data



NOTA - Caribbean



Real-Time upgrades to fill Gaps

- Motivated by Swan Island M7.5 earthquake
- Starlink Mini installed at remote sites to fill in real-time GNSS coverage gaps
- Completed upgrades to NOTA in April 2025
  - Pedro Cay, Jamaica
  - Sombrero Island, Anguilla
- Planned upgrades to NOTA in 2025
  - Swan Island, Honduras
    - (including new collocated COPECO seismic station)
  - Cocos Island, Costa Rica
  - Guadalupe Island, Mexico

Sombrero Island, Anguilla (CN58)

Pedro Cay, Jamaica (CN11)

Data Services Update

Migrating Data Operations to the AWS cloud

- Real-time and Batch data services
  - Input, archive and distribution
  - GAGE/UNAVCO completed September 2023
  - SAGE/IRIS in process June 2024

- Advantages
  - Reduced real-time latency
    - Streaming GNSS to USGS ShakeAlert systems
  - Reduced costs to NSF
  - Opens/Broadens access to data
  - Enables Science on large and multidisciplinary datasets
    - AI/ML
    - Data Discoverability across multidisciplinary data types
      - current data types: GNSS, seismic, Magnetotelluric, InSAR, SAR, Topography
      - Proposed new data types: DAS, near-surface, sea-floor GNSS

International Collaboration
Colaboración Internacional

- The success of the network and our ability to maintain operations is in great thanks to the strong partnerships that we have with local agencies and collaborators
- As we are able to fully integrate GNSS data into the tsunami forecasting models, we have the ability to greatly increase the total number of monitoring stations and overall network density by increasing this collaboration
- Government Lands and Surveys departments and commercial surveyor groups also maintain networks of realtime GNSS stations across the region
- Encouraging partnerships provides mutual benefit

- El éxito de la red y nuestra capacidad para mantener las operaciones se debe en gran medida a las sólidas asociaciones que tenemos con agencias y colaboradores locales.
- Como podemos integrar completamente los datos GNSS en los modelos de pronóstico de tsunamis, tenemos la capacidad de aumentar en gran medida el número total de estaciones de monitoreo y la densidad general de la red al aumentar esta colaboración.
- Los departamentos gubernamentales de Tierras y Estudios y los grupos de topógrafos comerciales también mantienen redes de estaciones GNSS en tiempo real en toda la región.
- Fomentar las asociaciones proporciona beneficios mutuos

The End

Questions?