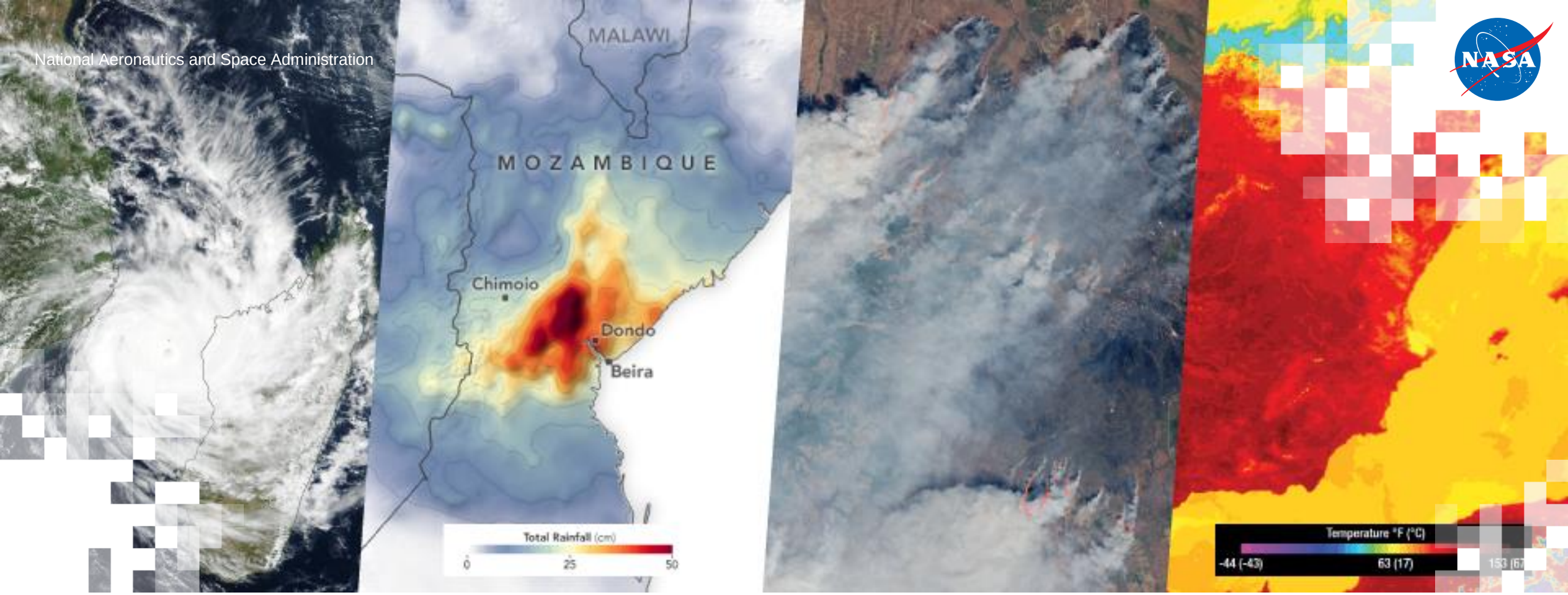
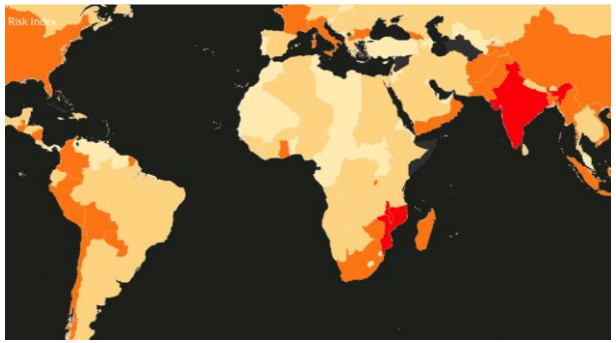


Earth Observations for Disaster Risk Assessment and Resilience

Amita Mehta and Sean McCartney

6-15 August 2019

Training Summary



Aug 6, 2019

- NASA Remote Sensing Data
- Socioeconomic Data for Disaster Risk Assessment: SEDAC

Aug 8, 2019

- Assessing Risk of Floods & Cyclones Using NASA Data

Aug 13, 2019

- Disaster Risk Assessment Case Studies
- NYS Dept of Health
- World Resources Institute

Aug 15, 2019

- Operational Application of Remote Sensing for Disaster Management
- Pacific Disaster Center

Terminology

- Disaster Risk Assessment (DRA)
- Hazard
- Exposure
- Vulnerability
- Disaster
- Disaster Risk
- Resilience
- Disaster Risk Reduction (DRR)
- Disaster Risk Management (DRM)

DRA Using Remote Sensing Observations: Limitations

- Low and different spatial and temporal resolutions of various earth observations:
  - IMERG Precipitation (~10 km, half-hour)
  - MERRA-2 and GEOS-5 Winds, Sea Level Pressure (~25-60 km, hour)
  - MODIS(500 m, ~2200 km swath, day) and NLDAS (12 km) Land Surface Temperatures
  - Socioeconomic, Terrain, Impervious Surface Data (30 m to ~ several km, static to multi-year)

- Quantitative data analysis, in situ observations are required for accurate DRA

DRA for Flooding: Limitations

- DRA for flood in this webinar was inferred from area-integrated heavy/extreme rain, flooding within urban area may be difficult to resolve
- Flood monitoring tools based on optical data (MODIS – 250 m, ~2000 km swath, 1-2 day; and Landsat – 30 m, 185 km swath, 16 day) can not see flooded surface through clouds
- Flood monitoring with microwave data (e.g. Synthetic Aperture Radar – 5 m, 250 km swath, 12 day) have limited temporal coverage
- Flood models require high-resolution weather data and routing scheme
- DRA for flooding based on remote sensing would require combined analysis of in situ data, multi-sensor data, and flood modeling data

For More Information

- Monitoring Urban Floods Using Remote Sensing:
  - https://arset.gsfc.nasa.gov/disasters/webinars/urban-flooding-18
- Advanced Webinar: Radar Remote Sensing for Land, Water, & Disaster Applications; Capacitación en Línea Avanzada: La Teledetección por Radar y sus Aplicaciones para la Tierra, el Agua y Desastres:
  - https://arset.gsfc.nasa.gov/disasters/webinars/advanced-SAR-18
- Monitoring Tropical Storms for Emergency Preparedness
  - https://arset.gsfc.nasa.gov/disasters/webinars/18-tropical-storms

DRA Using Remote Sensing Observations: Advantages

- Provide data where no in situ data are available
- Spatially uniform data compared to in situ data
- Data are open source, data access and download available via web-tools
- Availability of near-global, past, present, and forecast hazard data together with exposure & vulnerability data allow for improved DRA
- Regionally, combination of Earth observations, Earth system model outputs, and socioeconomic data, with in situ data would lead to better DRA augmenting improved DRM strategies

Homework & Certificate

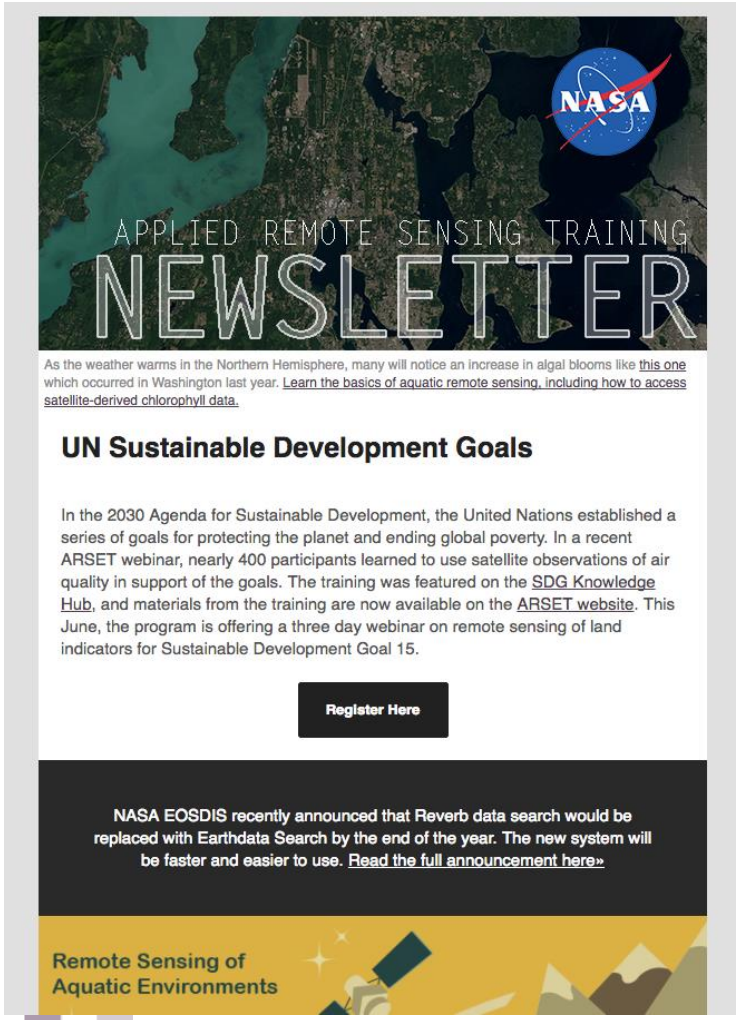
- Homework:
  - 2 homework assignments
  - Answers to homework must be submitted via Google Forms

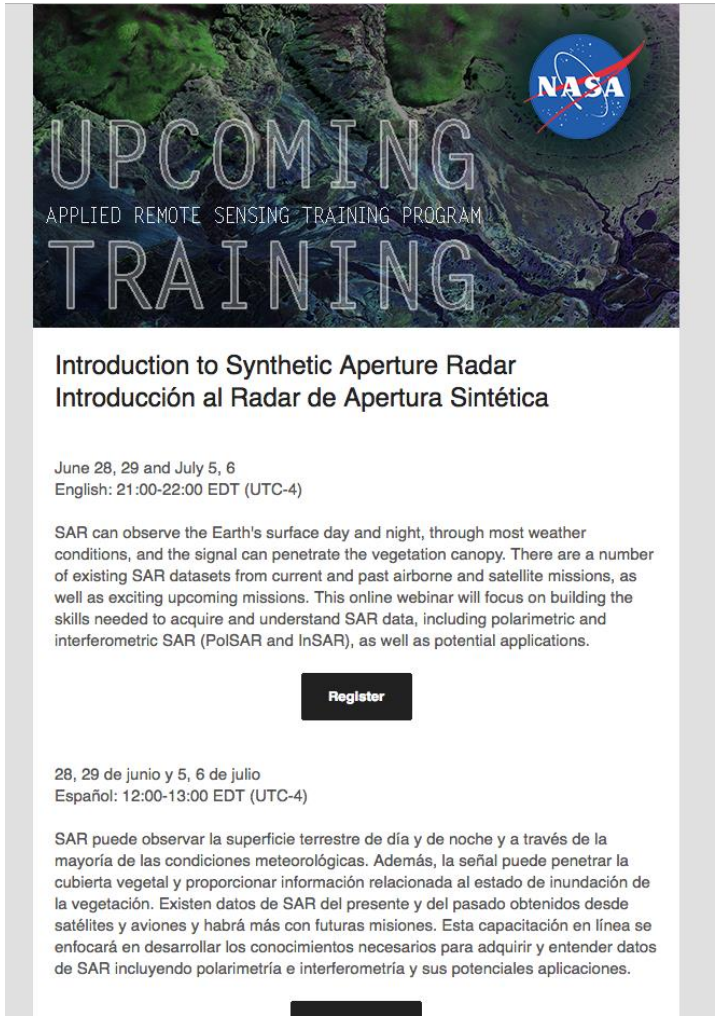
- Certificate of Completion:
  - Attend all webinars
  - Complete 2 homework assignments by 30 August

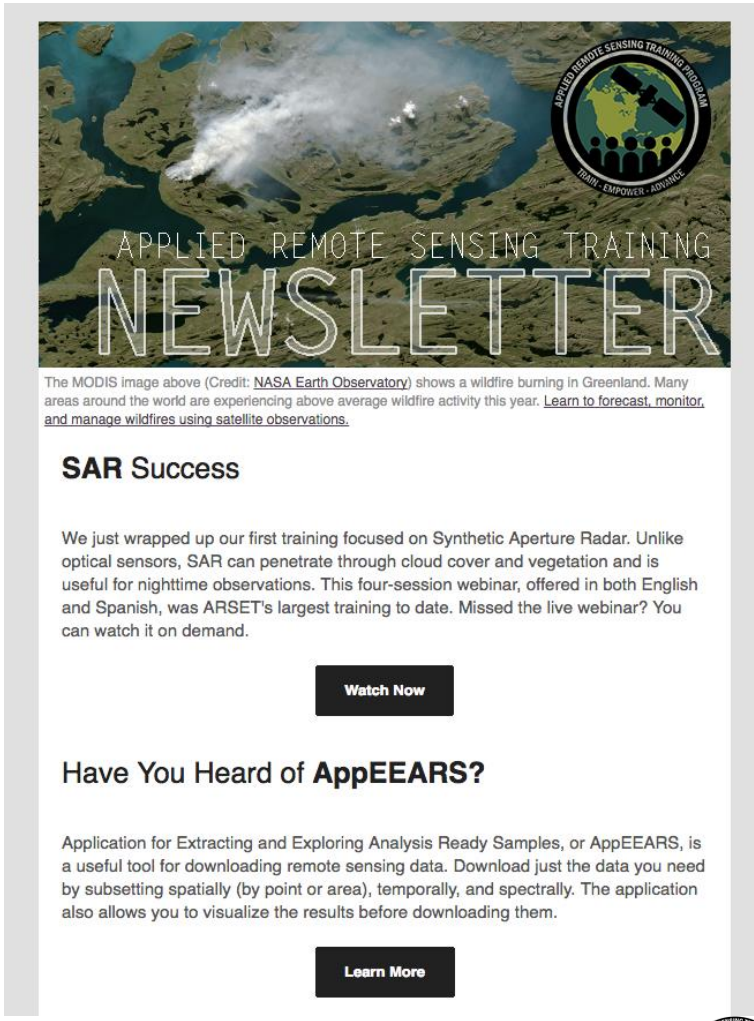
- You will receive certificates approximately two months after the completion of the course from: marines.martins@ssaihq.com

Sign up for the ARSET Listserv

https://lists.nasa.gov/mailman/listinfo/arset

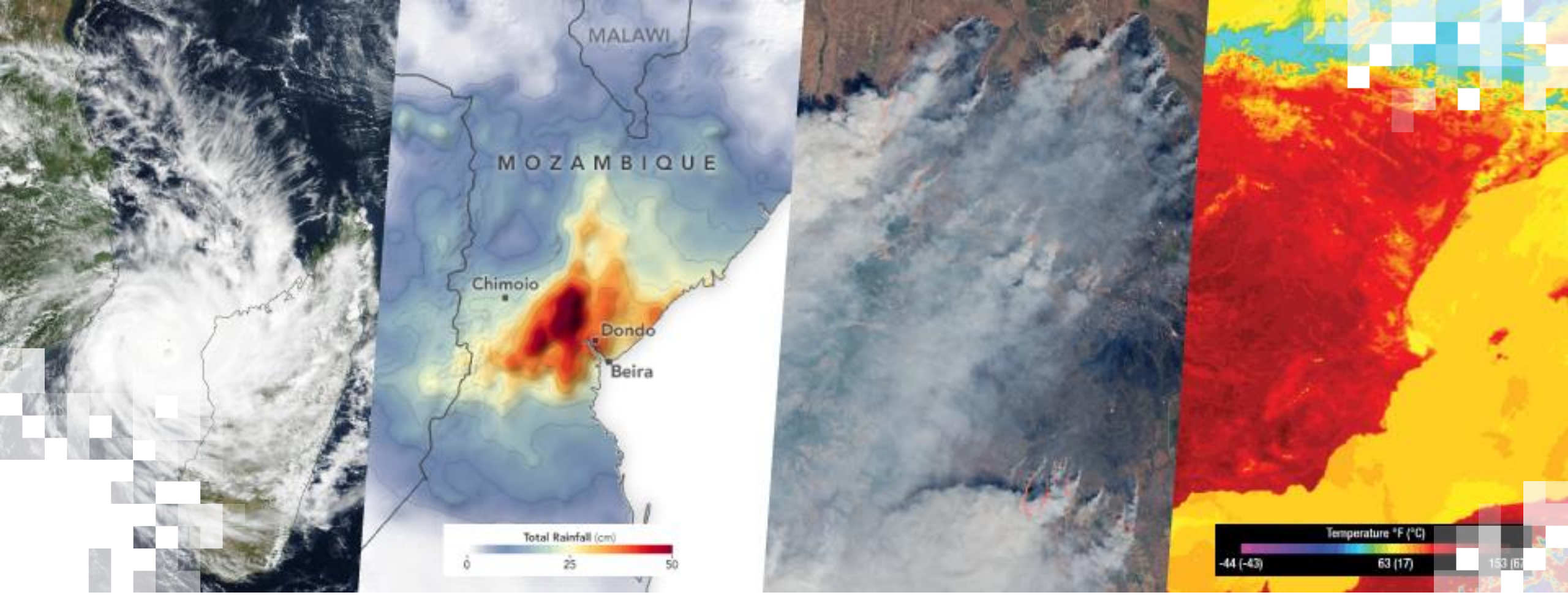






Thank you to our guest presenters!

- SEDAC:
  - Susana B. Adamo, Ph.D., CIESIN
- NYS Department of Health
  - Tabassum Insaf, Ph.D.
- PDC
  - Michael Chatman
  - Joseph Green, Ph.D.
- WRI
  - Corey Filiault
  - Liz Saccoccia
  - Amelia Snyder
  - Samantha Kuzma
  - Leah Schleifer
  - Emily Nilson


MALAWI
MOZAMBIQUE
Chimoio
Dondo
Beira
Total Rainfall (cm)
0
25
50
Temperature °F (°C)
-44 (-43)
63 (17)

Thank You!