National Laboratory for Earth Observation (LANOT)

Institute of Geography
National Autonomous University of Mexico.

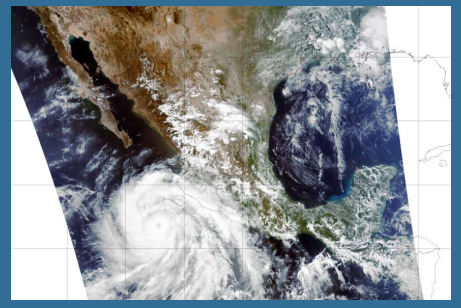
http://www.lanot.unam.mx

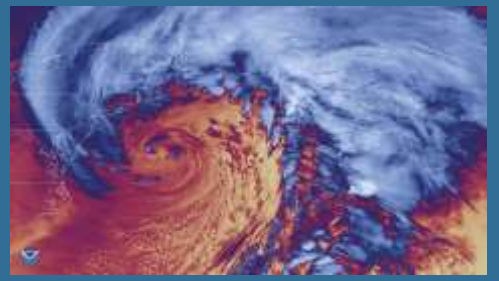
Americas Geospatial Forum

CDMX, October 10, 2019

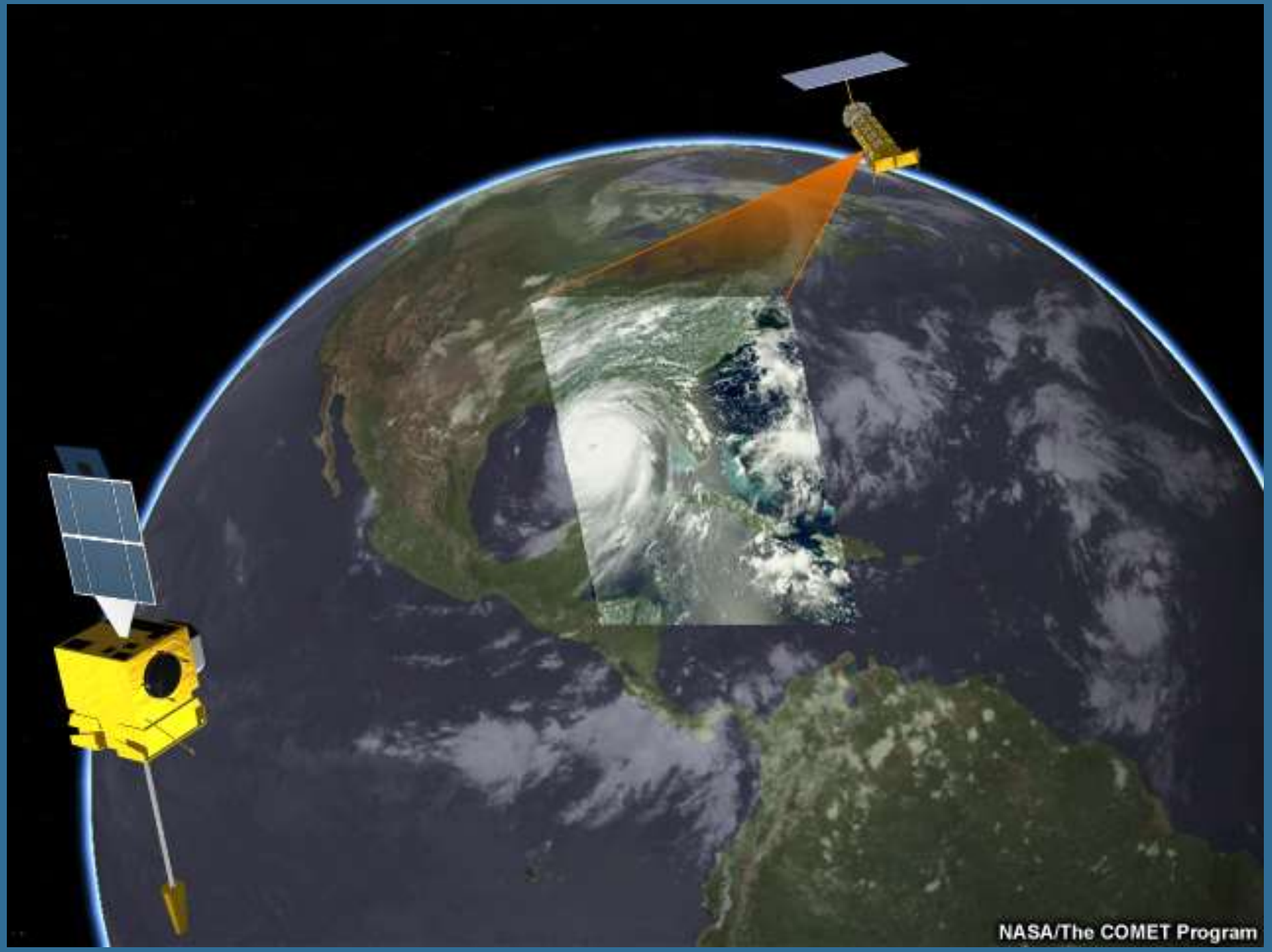
UN-GGIM Academic Network

GOALS: Receive, store, process, and distribute remote sensing data, and images to assess changes in vegetation cover, as well as constantly monitoring the oceans and the atmosphere, and to establish their interrelationship and impacts into society.



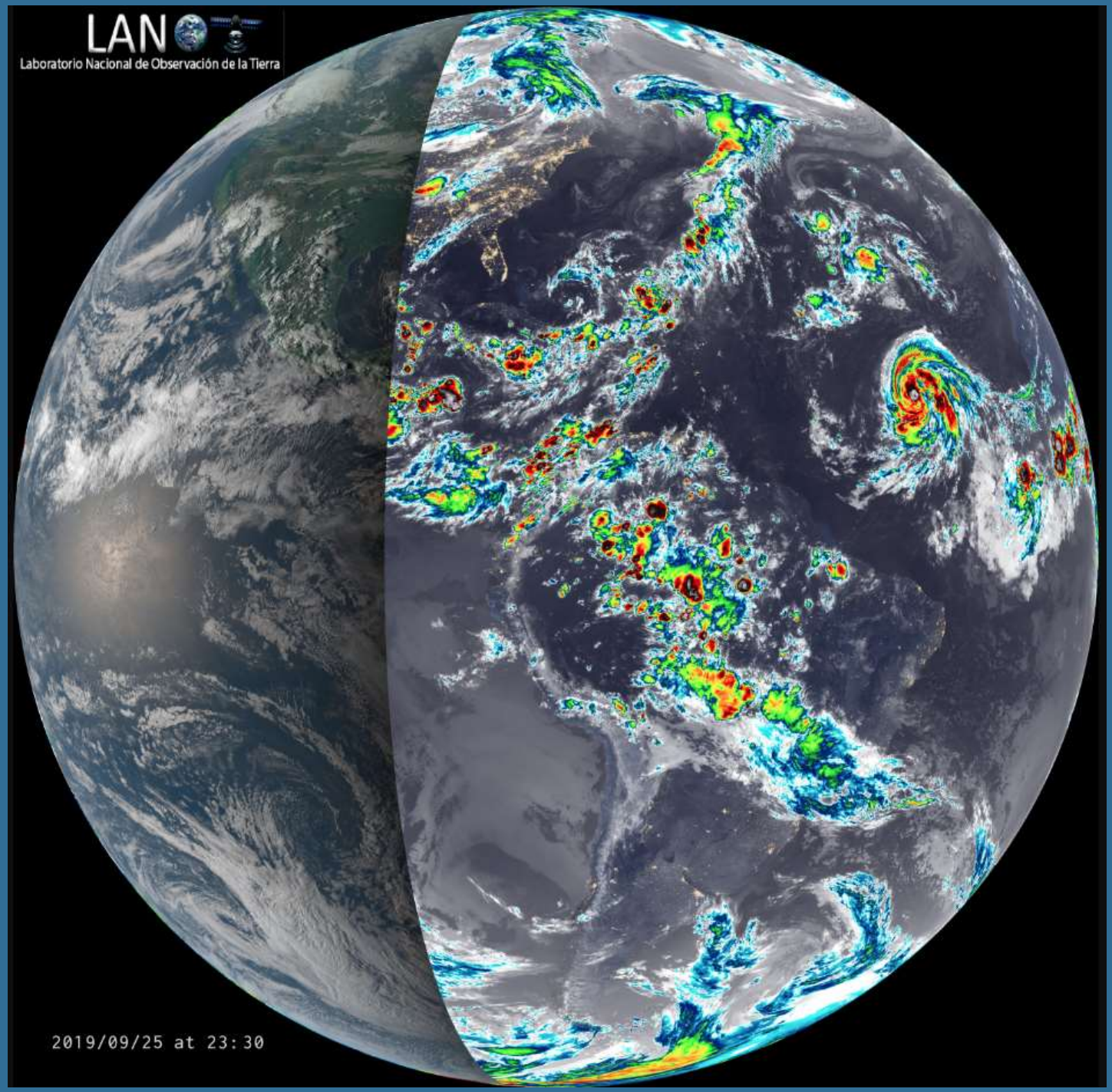


SATELLITE RECEIVING STATIONS


NASA/The COMET Program

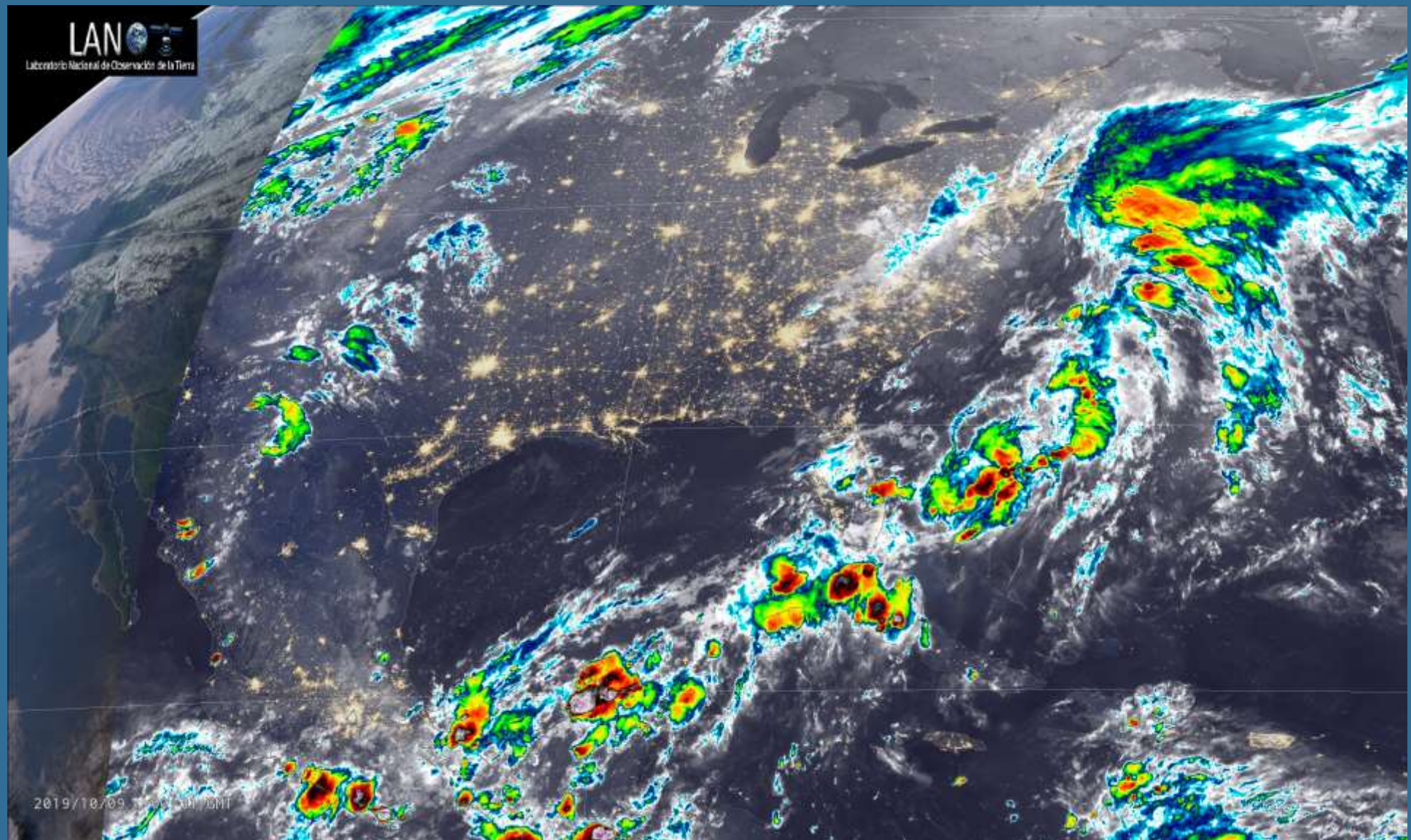
GOES-16

Hemispheric coverage
every 10 minutes

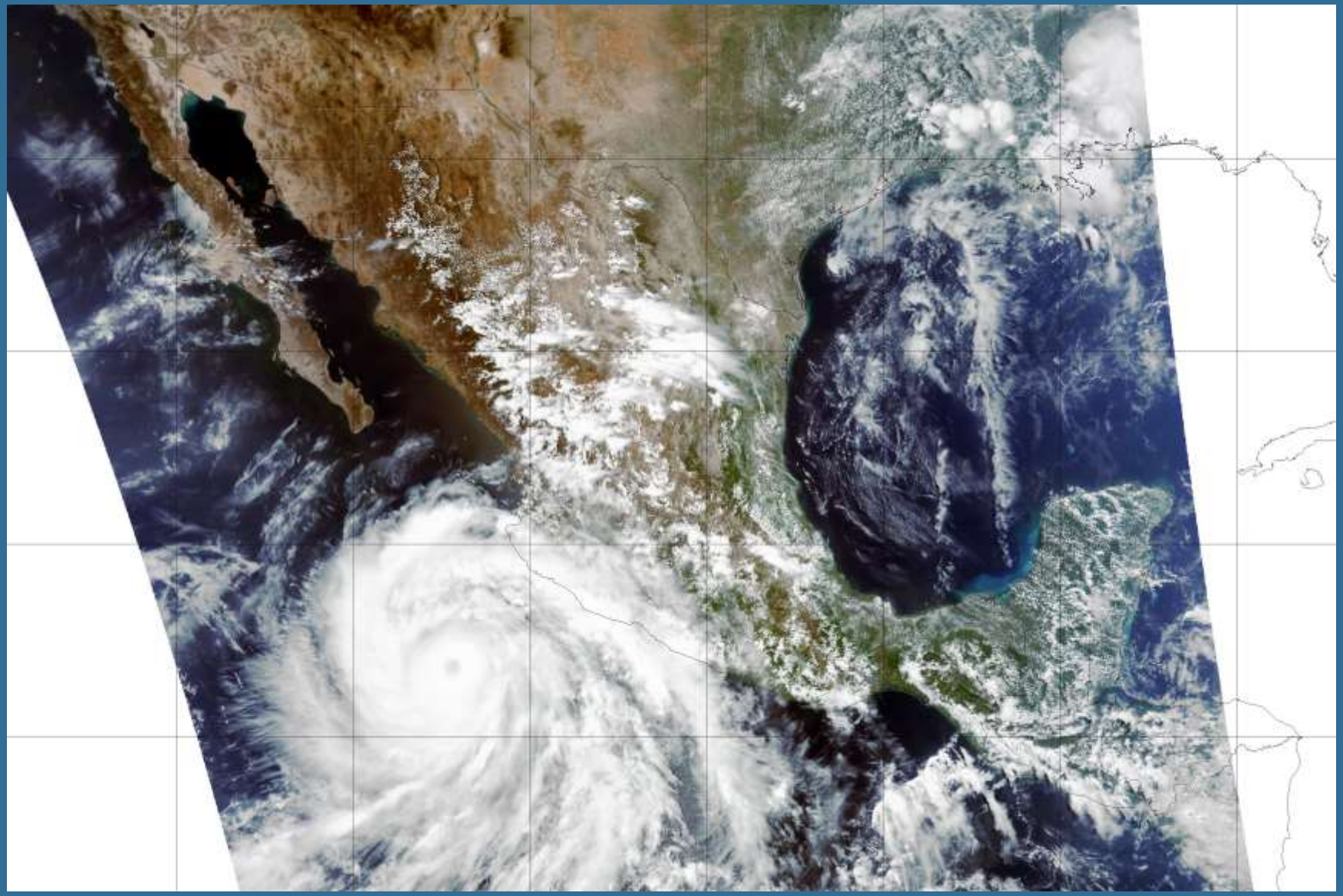


GOES-16

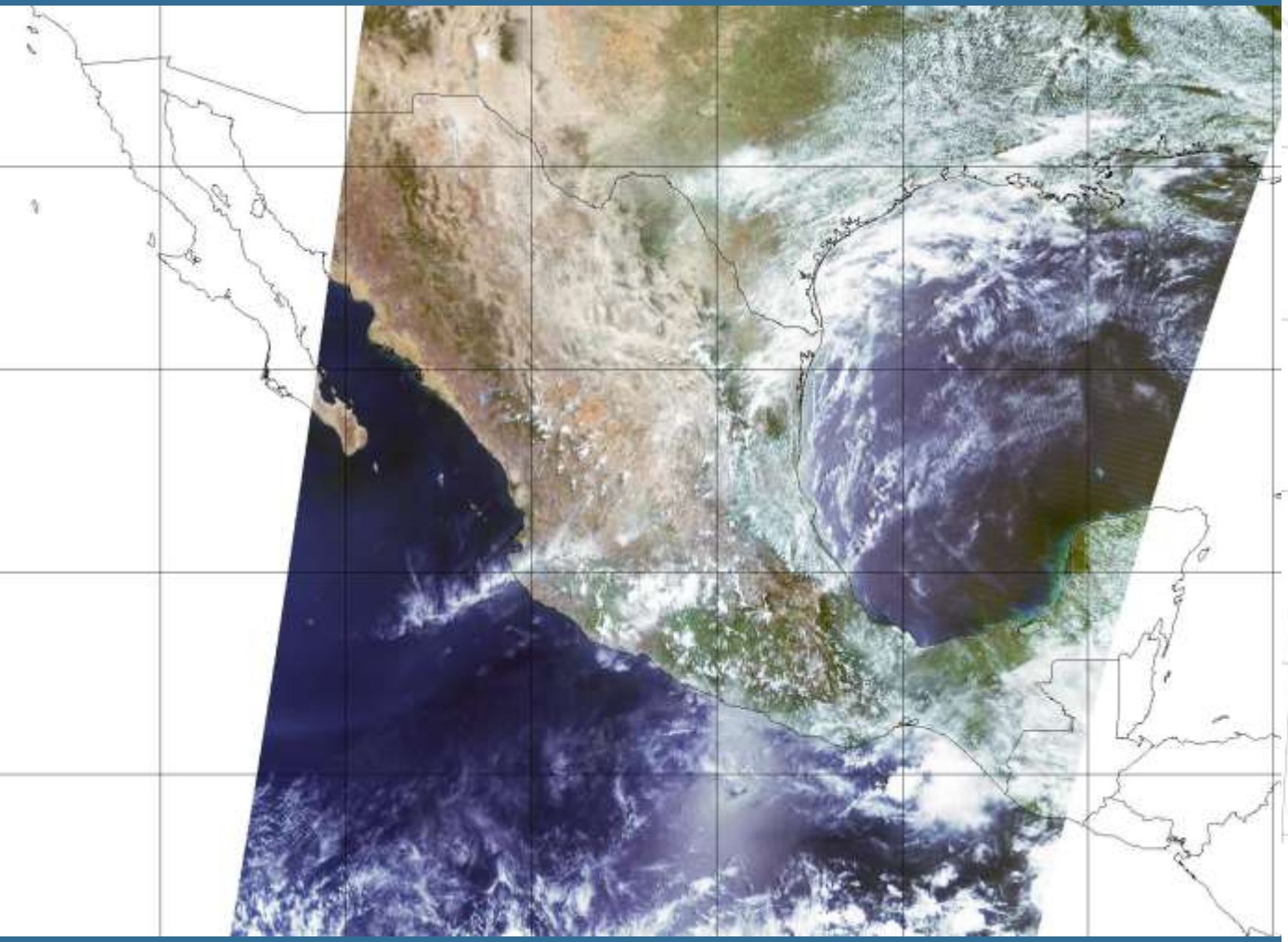
Regional coverage every 5 minutes

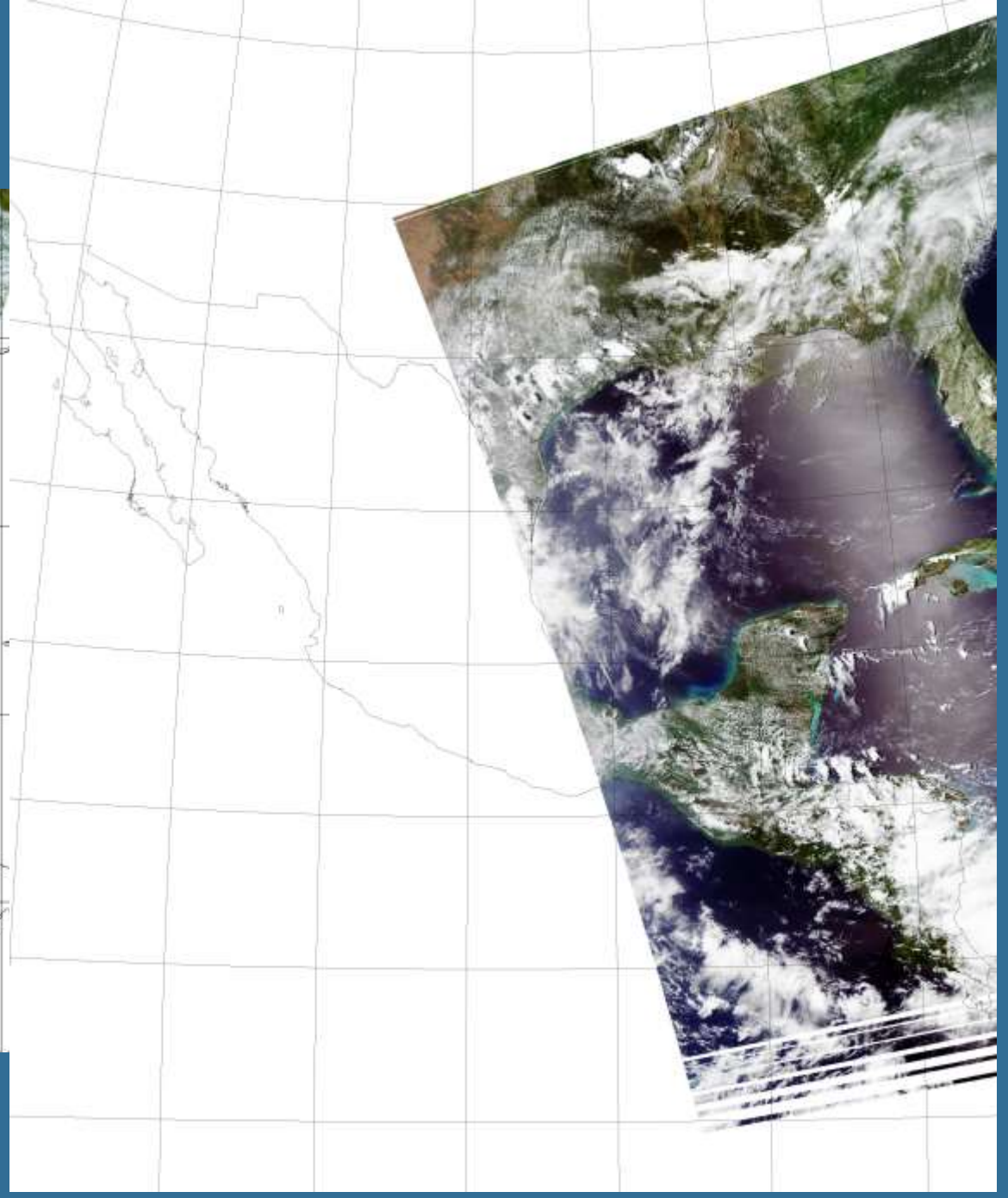


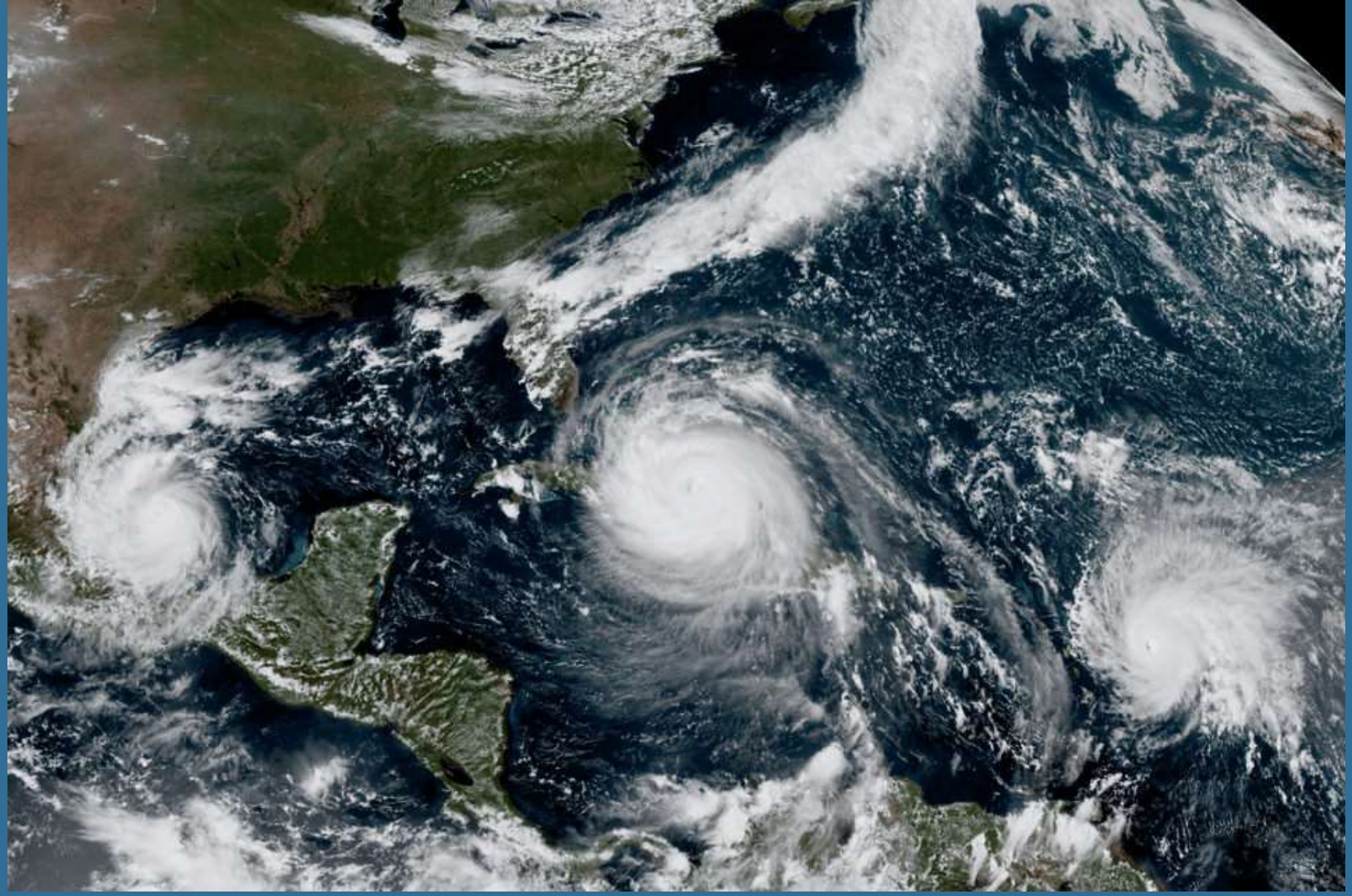
POLAR ORBITING SATELLITES
Less coverage, more spatial resolution



POLAR ORBITING SATELLITES







Products and services supplied by LANOT, allow to precisely georeference potentially severe storms, issuing reliable alerts to population. These events directly affect people’s security, property, economy, and social development.

PRODUCTS

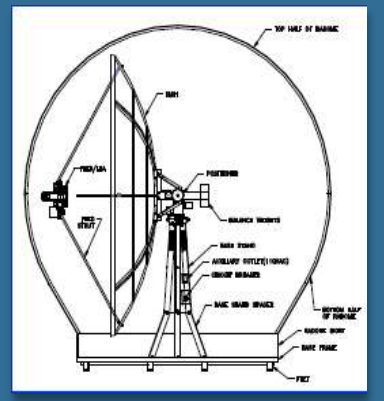
GOES-16	Polar orbiting satellites	Geonet Cast
16 SPECTRAL BANDS + 34 products	**Images from 10 satellites Aqua, Terra, NOAA (15, 18, 19, and 20), EUMETSAT (Metop 1 y 2) and SUOMI NPP-1.**	**Distribution of images under extreme conditions Early warnings on: forest fires, severe storms, thunderbolts, etc**
NDVI, wind velocity, land and sea temperatures, hot spots, oceanic currents, lighting, volcanic ash, aerosols, etc.	**Vegetation, suspended sediments, hot spots, land and sea temperatures, crops, etc**	**Algorithm generation at national and regional level (Caribbean and Central America)**

- Our Laboratory supplies last generation data and imagery to continue the vanguard tradition of the Geography Institute, generating higher quality maps in the projects which include land, oceans, and the surrounding atmosphere.

GOES_16

GeonetCast

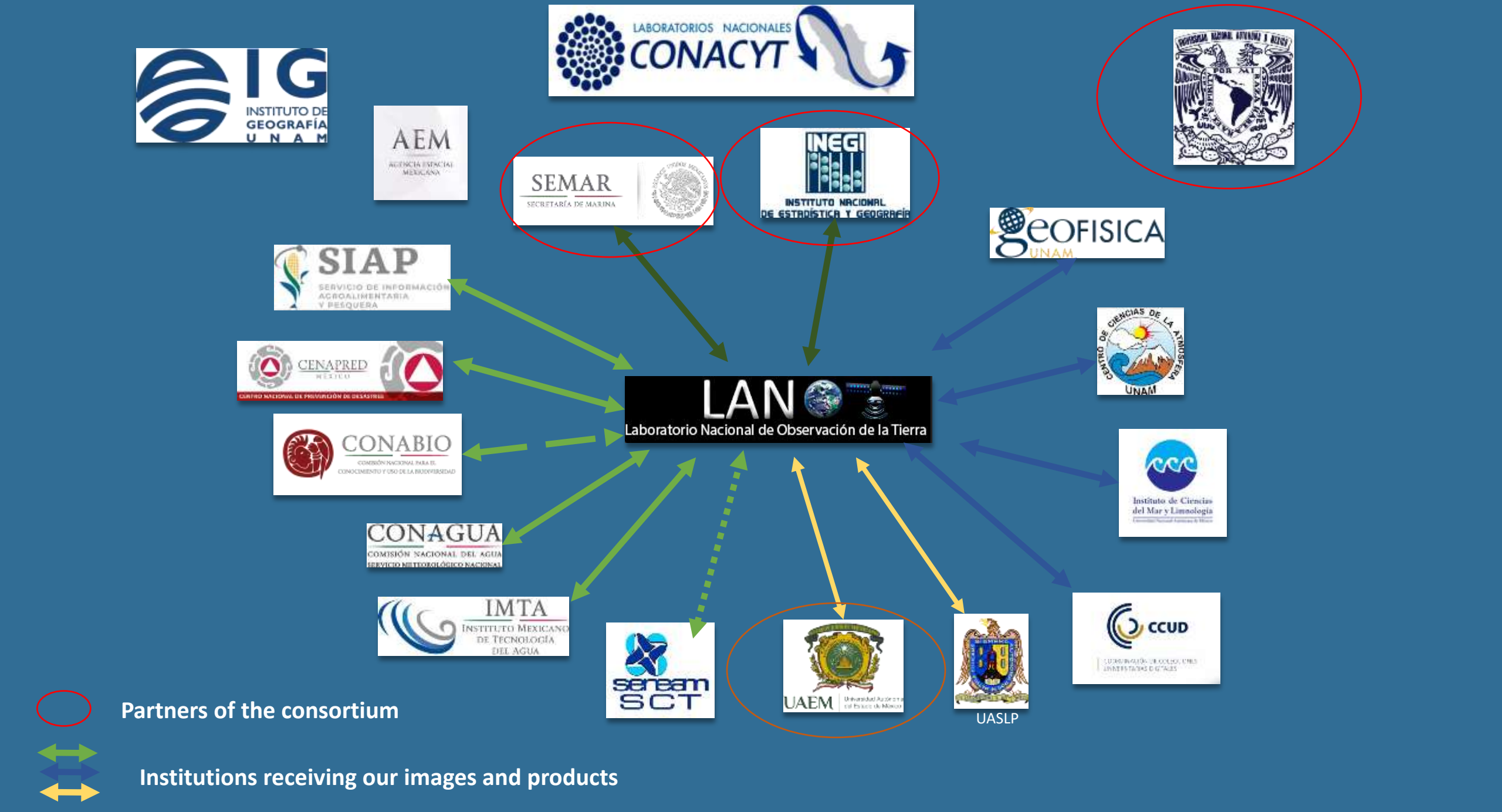
JPP
Joint Polar Satellite System



ENTITIES PARTICIPANTING IN LANOT's PROJECT.

COLLABORATIVE EFFORT

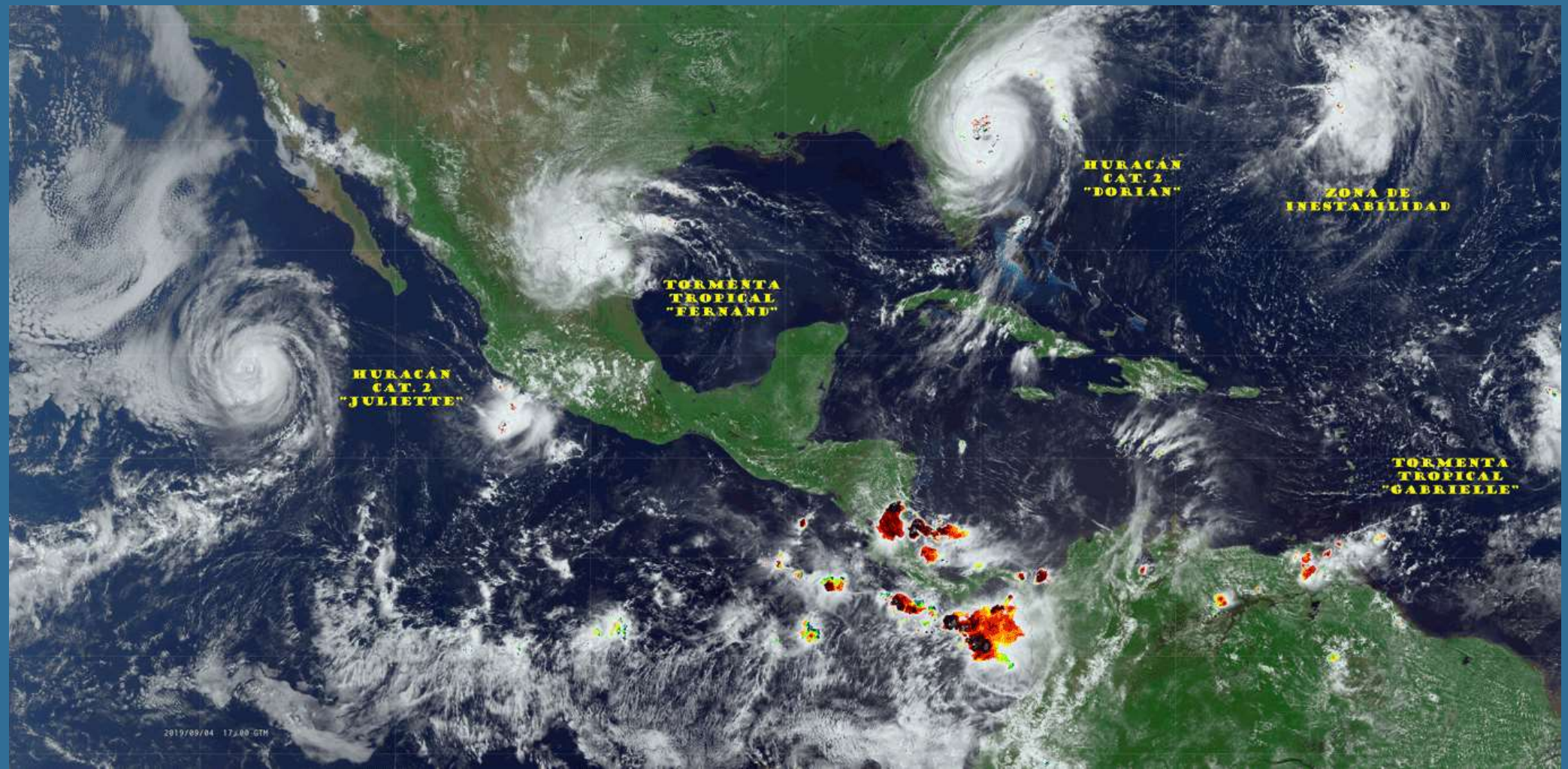
The strategy was to join different government, and academic institutions.


IG
INSTITUTO DE GEOGRAFÍA
U N A M
LABORATORIOS NACIONALES
CONACYT
AEM
AGENCIA ESPACIAL MEXICANA
SEMAR
SECRETARÍA DE MARINA
INEGI
INSTITUTO NACIONAL DE ESTADÍSTICA Y GEOGRAFÍA
geOFISICA
UNAM
SIAP
SERVICIO DE INFORMACIÓN AGROALIMENTARIA Y PESQUERA
CENAPRED
MÉXICO
CENTRO NACIONAL DE PREVENCIÓN DE DESASTRES
CENTRO DE CIENCIAS DE LA ATMÓSFERA
UNAM
CONABIO
COMISIÓN NACIONAL PARA EL CONOCIMIENTO Y USO DE LA BIODIVERSIDAD
LAN
Laboratorio Nacional de Observación de la Tierra
Instituto de Ciencias del Mar y Limnología
CONAGUA
COMISIÓN NACIONAL DEL AGUA
SERVICIO METEOROLÓGICO NACIONAL
IMTA
INSTITUTO MEXICANO DE TECNOLOGÍA DEL AGUA
seream
SCT
UAEM
UASLP
CCUD
Partners of the consortium
Institutions receiving our images and products

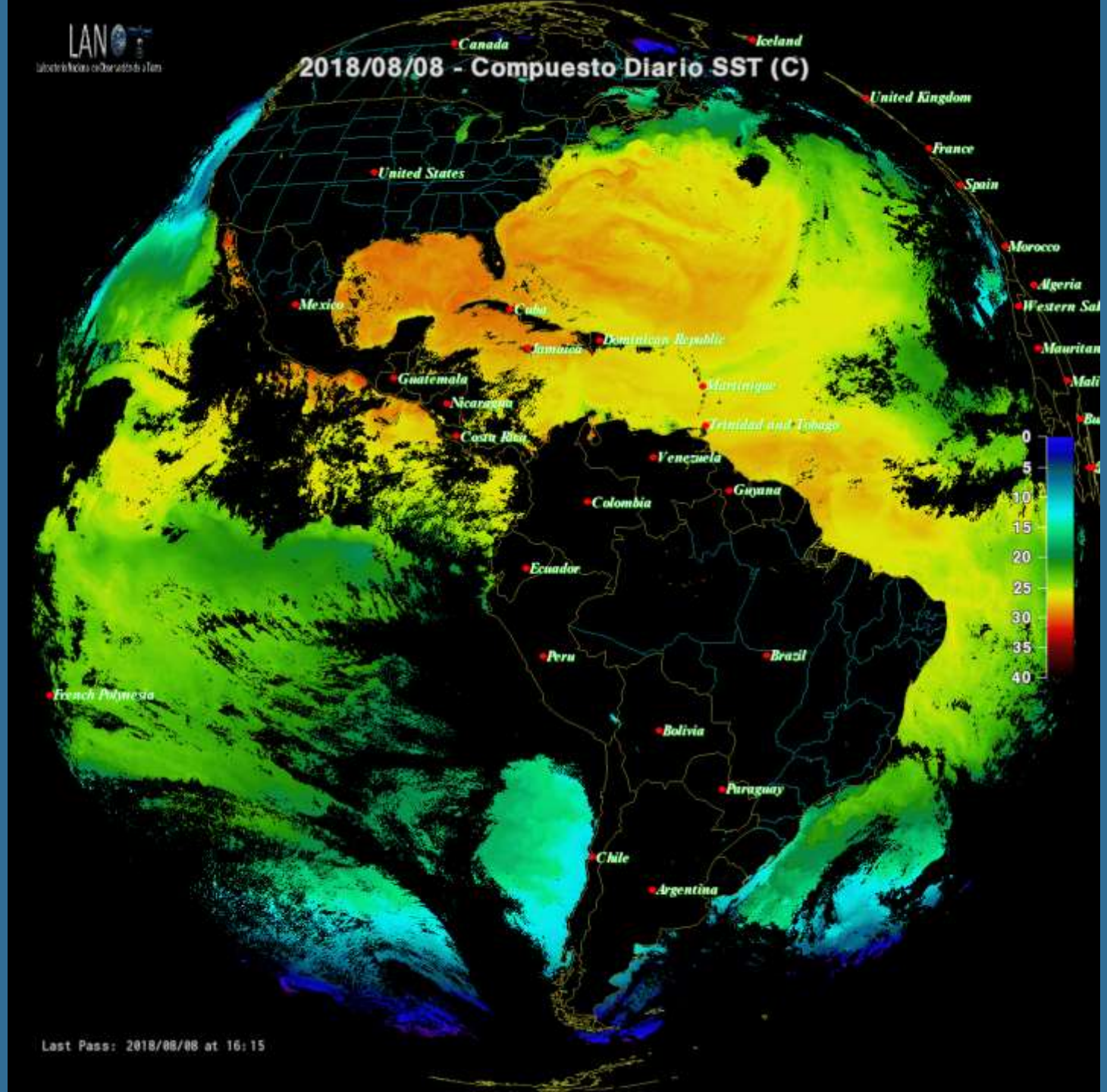
REGULAR LANOT PRODUCTS (SOME EXAMPLES)
CLOUD HEIGHT, STORMS, LIGHTING.

These phenomena cause direct impacts into society

GOES-16 Sept. 4, 2019

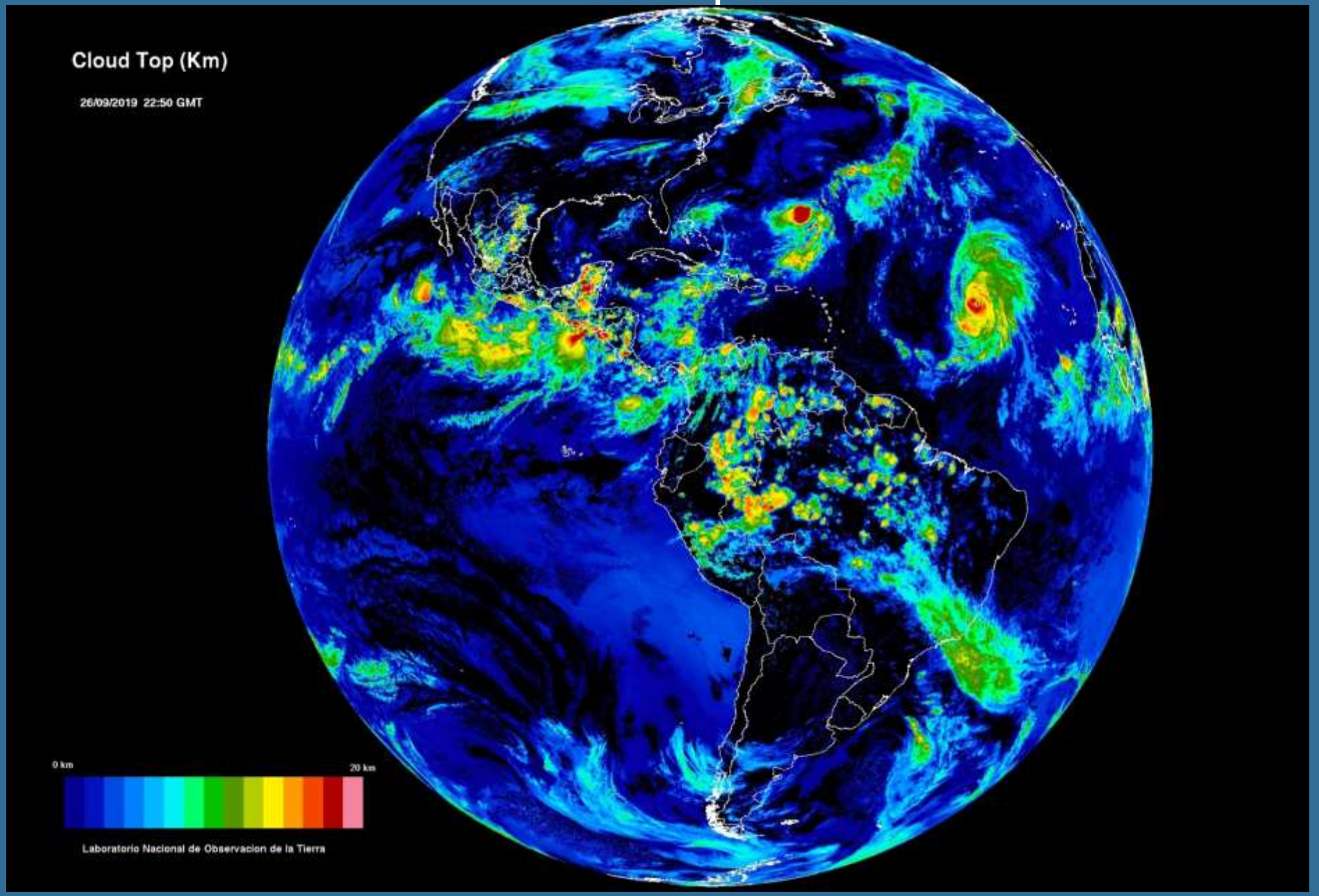


Sea Surface temperature

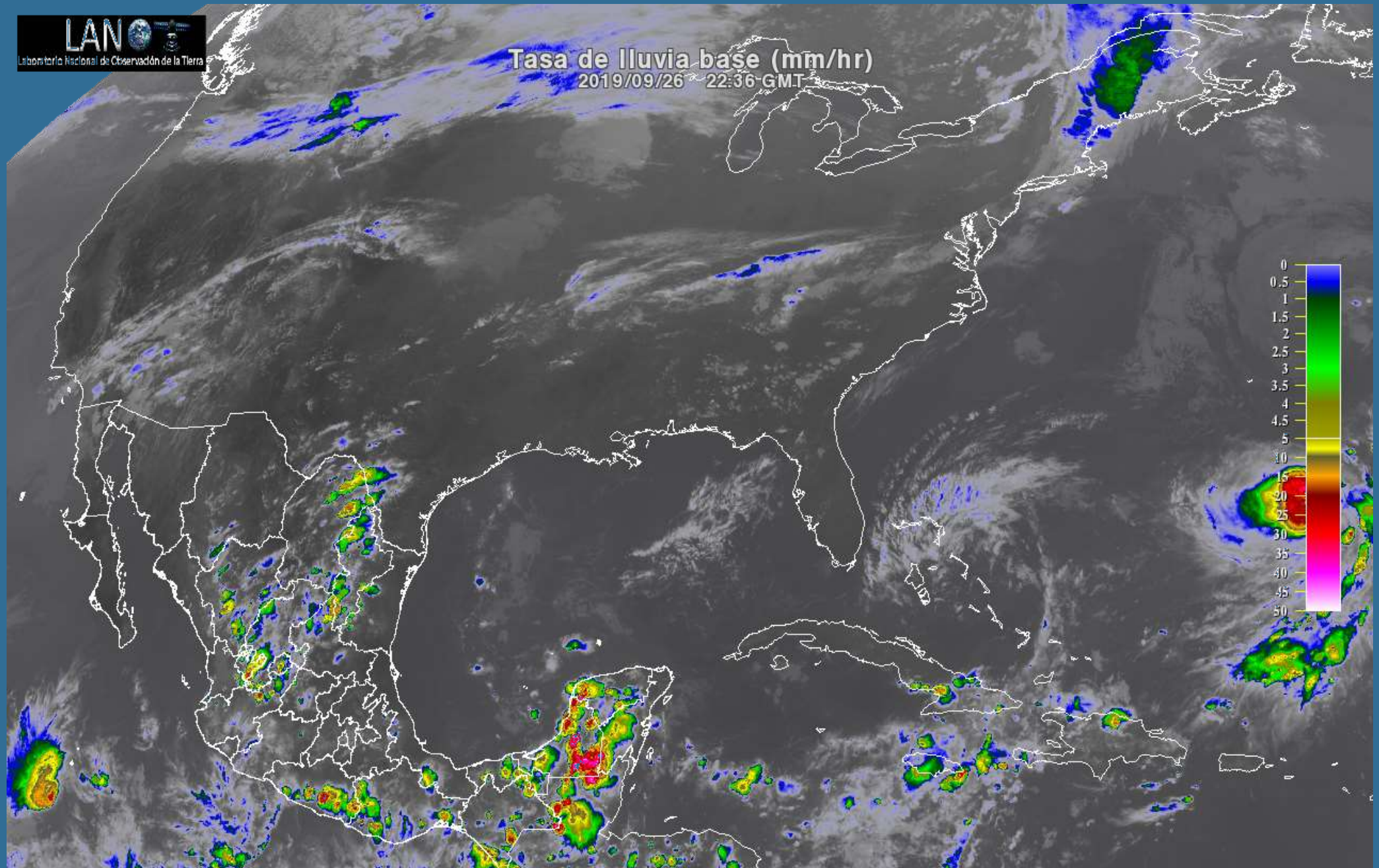


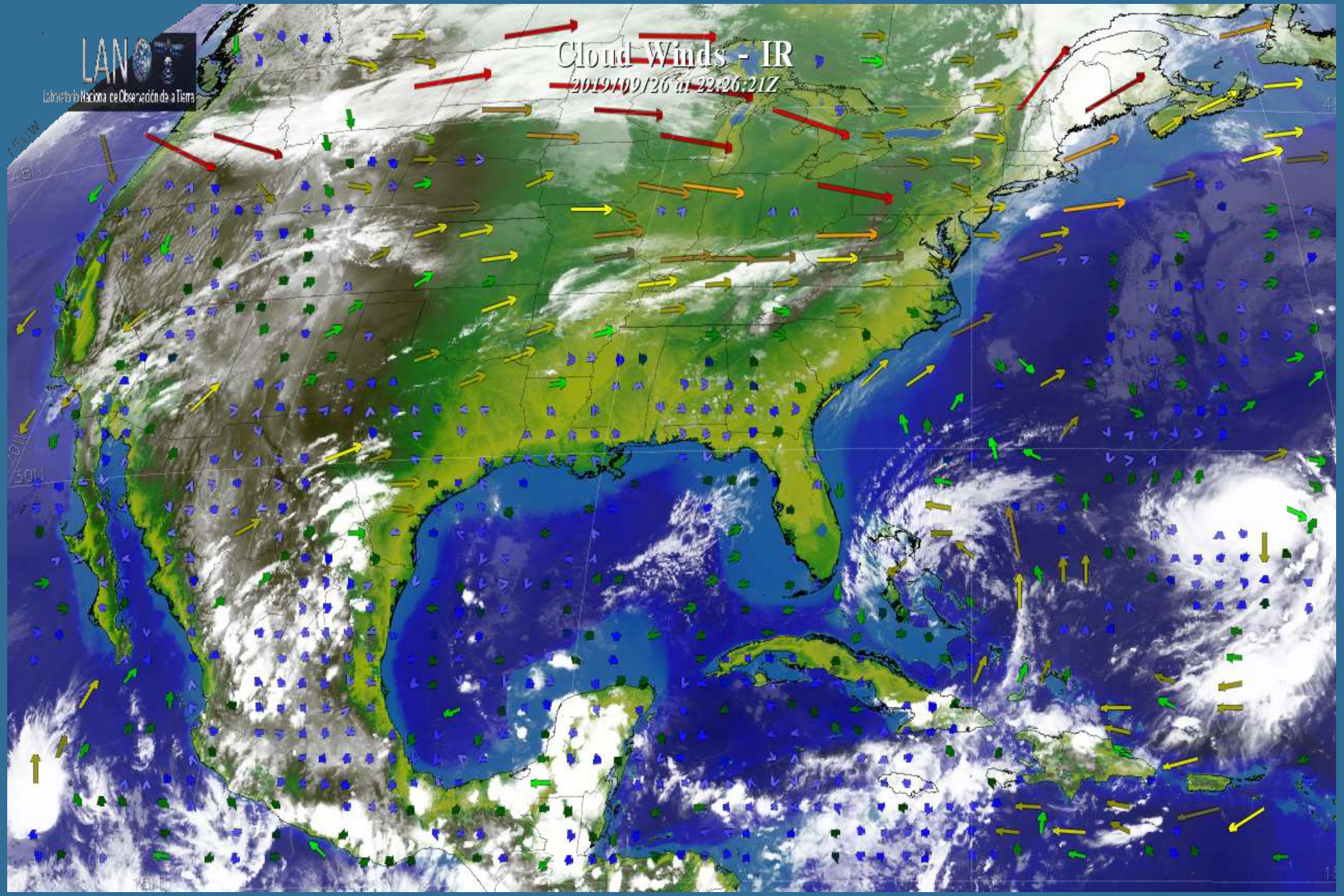
GOES-16 26/09/2019 22:50

Cloud Top

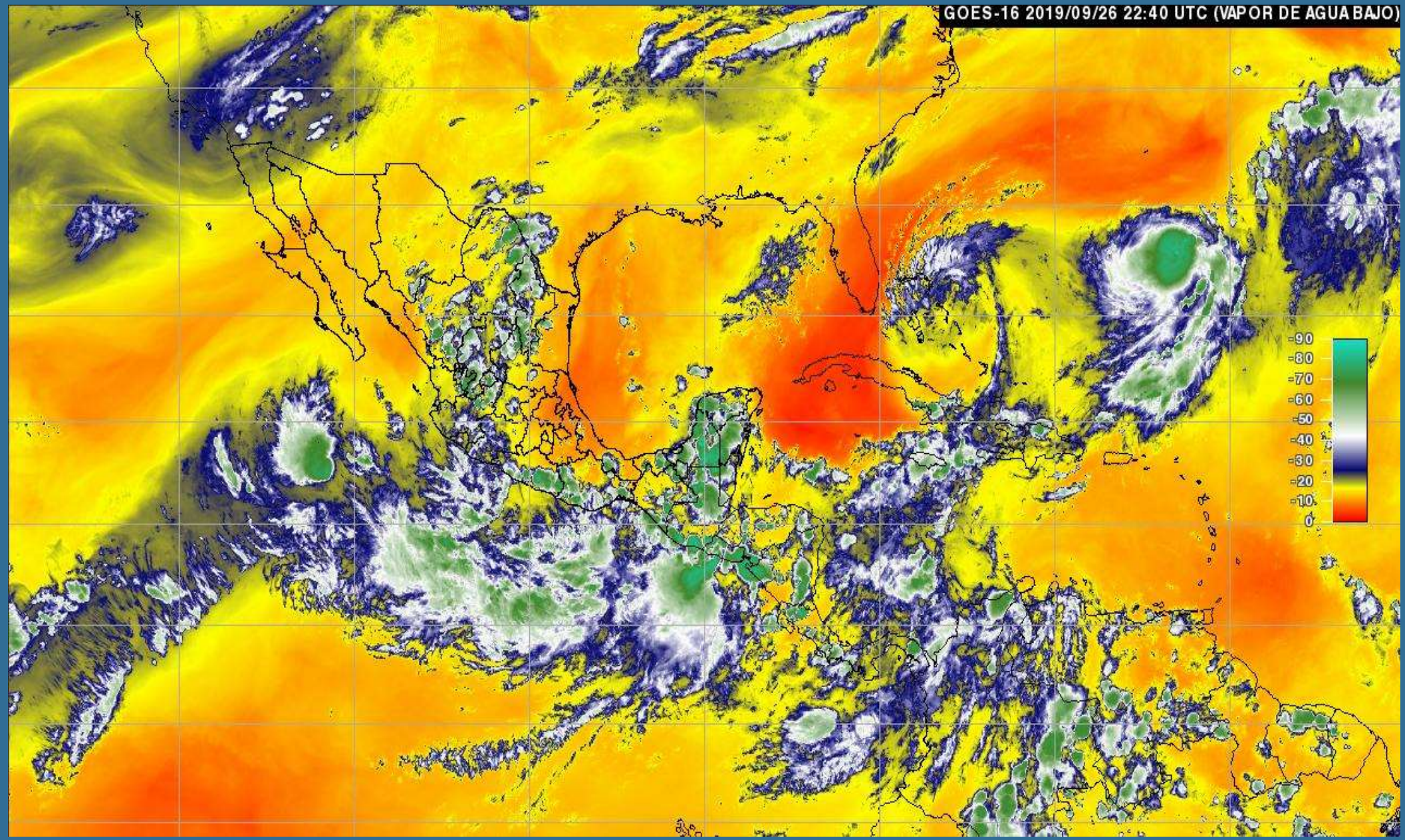


Base rainrate

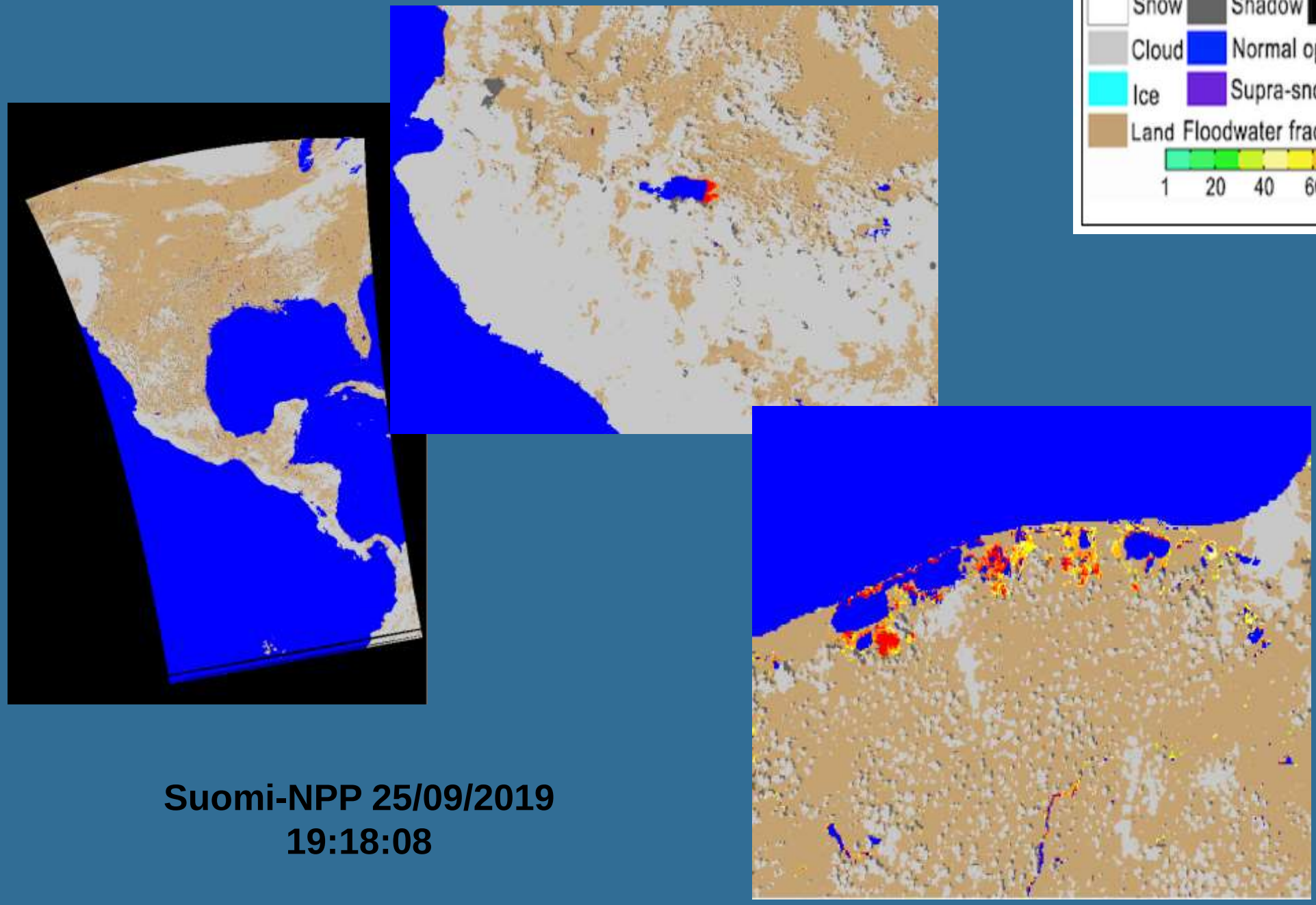



LANOT
Laboratorio Nacional de Observación de la Tierra
Cloud Winds - IR
2019/09/26 at 22:26:21Z

LOW ALTITTUDE WATER VAPOR

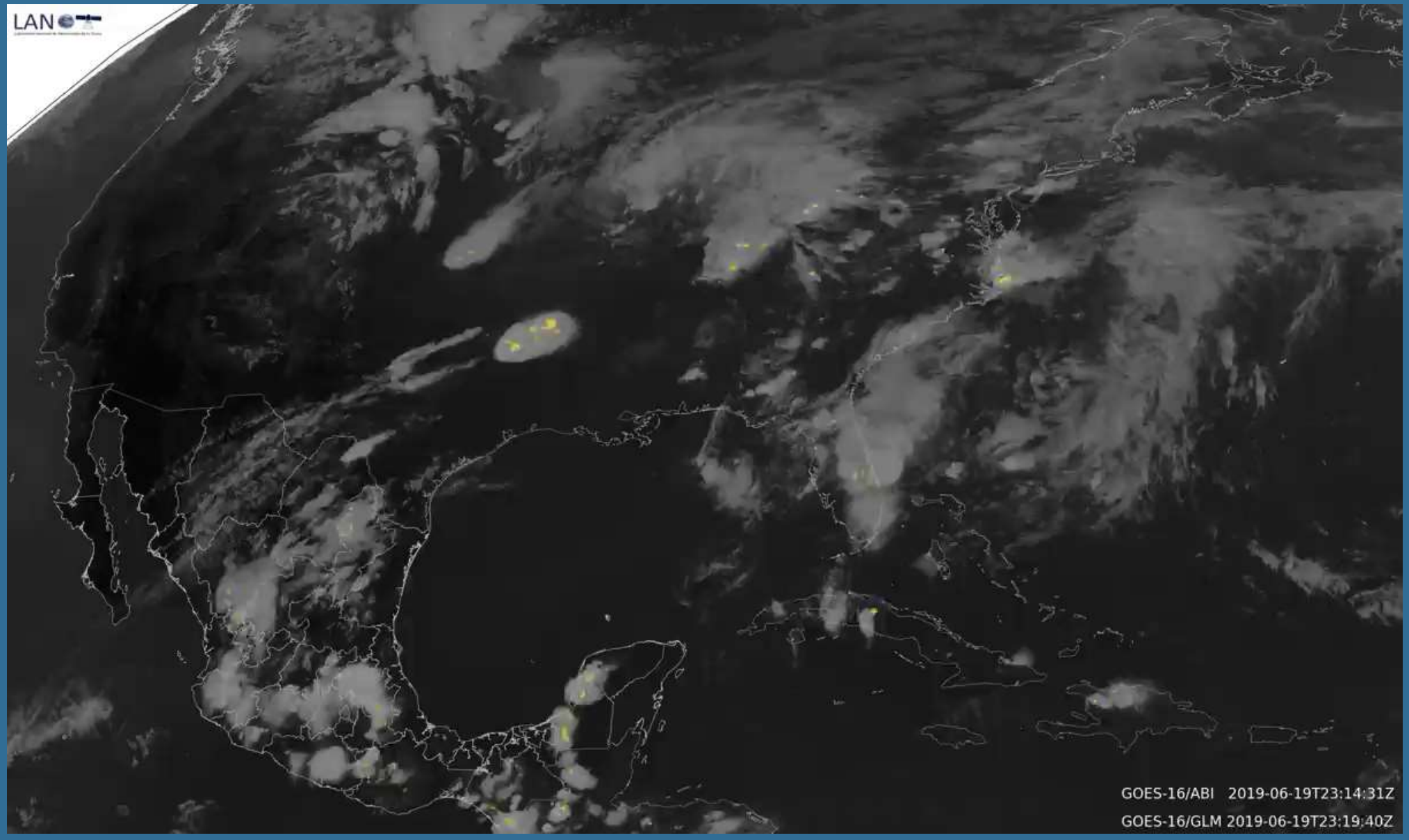


Flooding

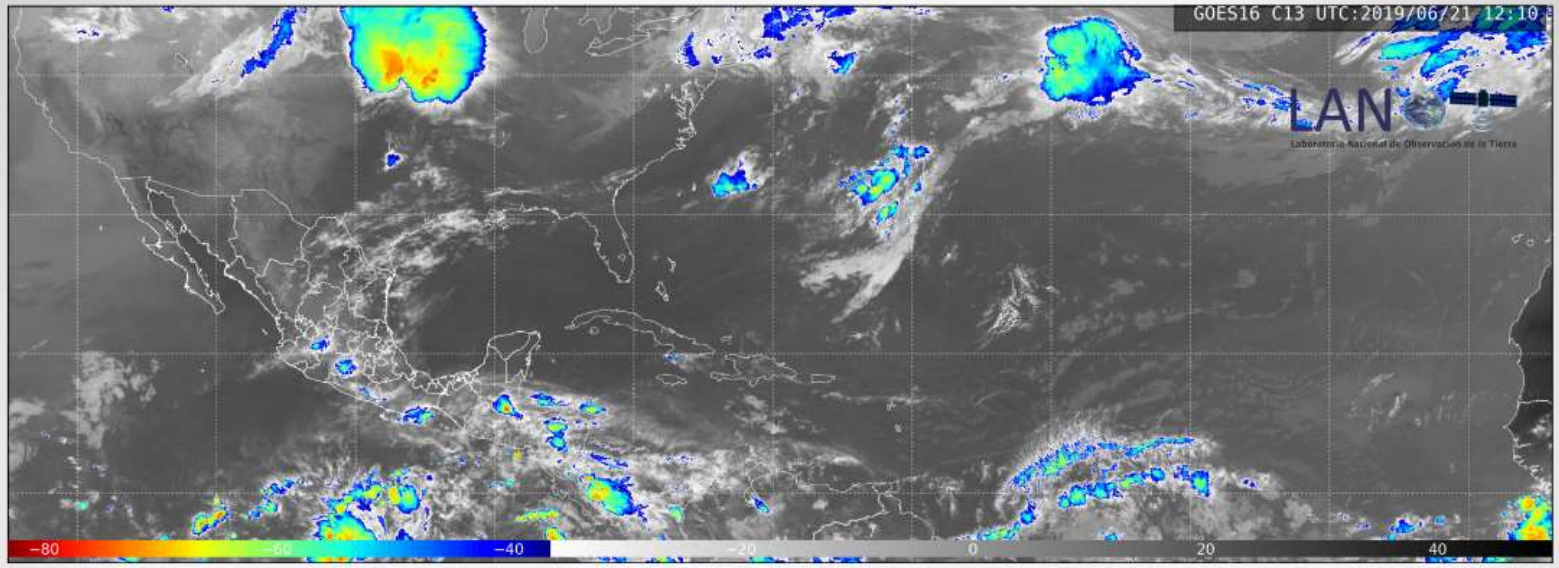


Suomi-NPP 25/09/2019
19:18:08

LIGHTING


LAN
GOES-16/ABI 2019-06-19T23:14:31Z
GOES-16/GLM 2019-06-19T23:19:40Z

DIRECT APPLICATIONS OF OUR PRODUCTS IN RESEARCH, AND BY CIVIL PROTECTION INSTITUTIONS



Animation speed: 1 (f/s)

Start Date: 06/21/2019

End Date: 06/22/2019

update

CENTRO DE CIENCIAS DE LA ATMÓSFERA UNAM

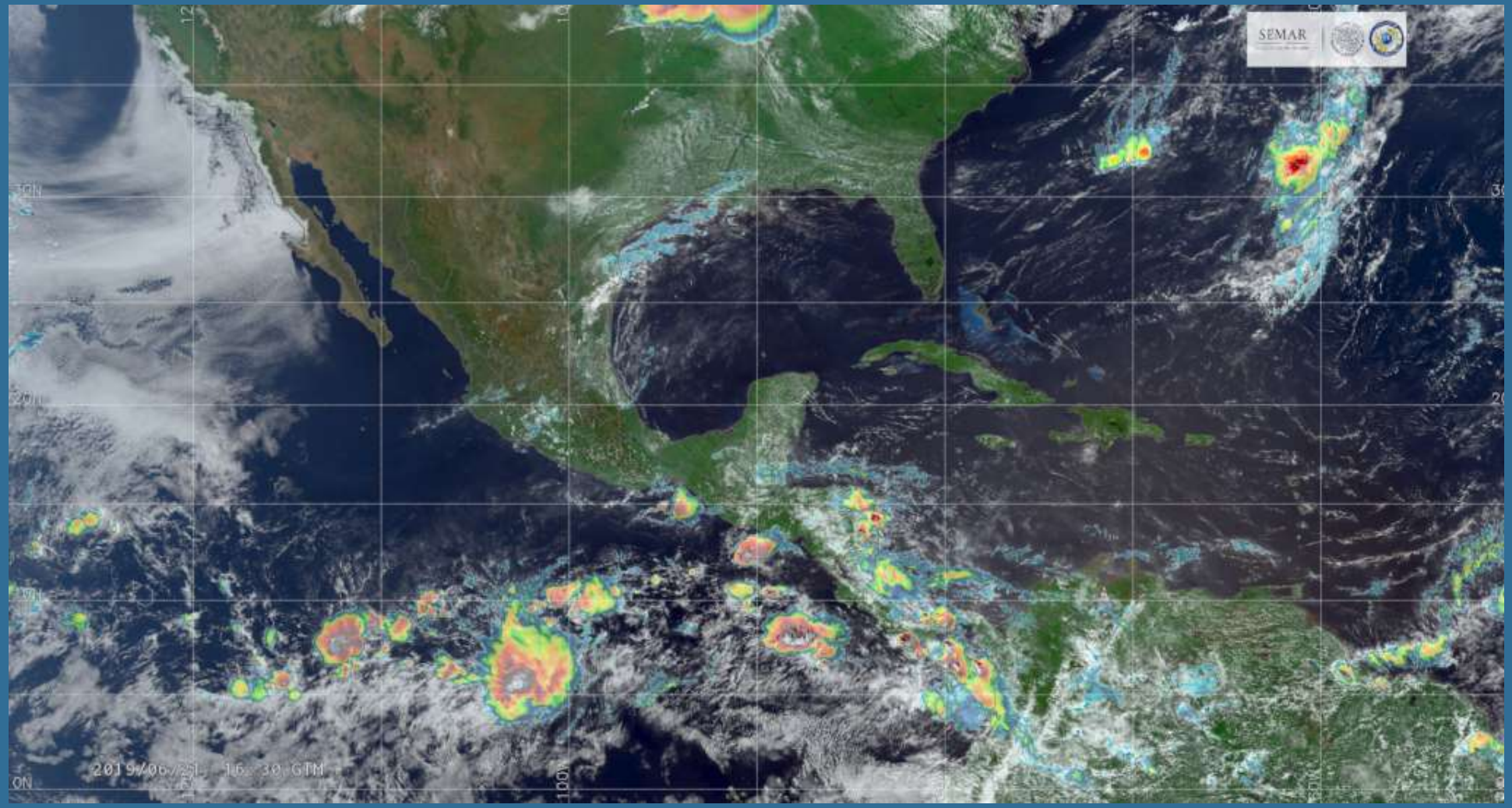
LAN Laboratorio Nacional de Observación de la Tierra

GOES-R

By M.S. Ixchel Zazueta, M. S. Alejandro Aguilar and Ph.D. Olmo Zavala, 2017

Note: NOAA's GOES-16 satellite is operational.

SEMAR (NAVY)
In charge of issuing navigation alerts.



NATIONAL CENTER FOR DISASTERS PREVENTION

http://www.atlasnacionalderiesgos.gob.mx/

Seleccionar Sector | Región IV

Satélite GOES Este

Satélite GOES Oeste

SMN

< > ■ ►

Intervalo (ms): 500

Media Refrescar

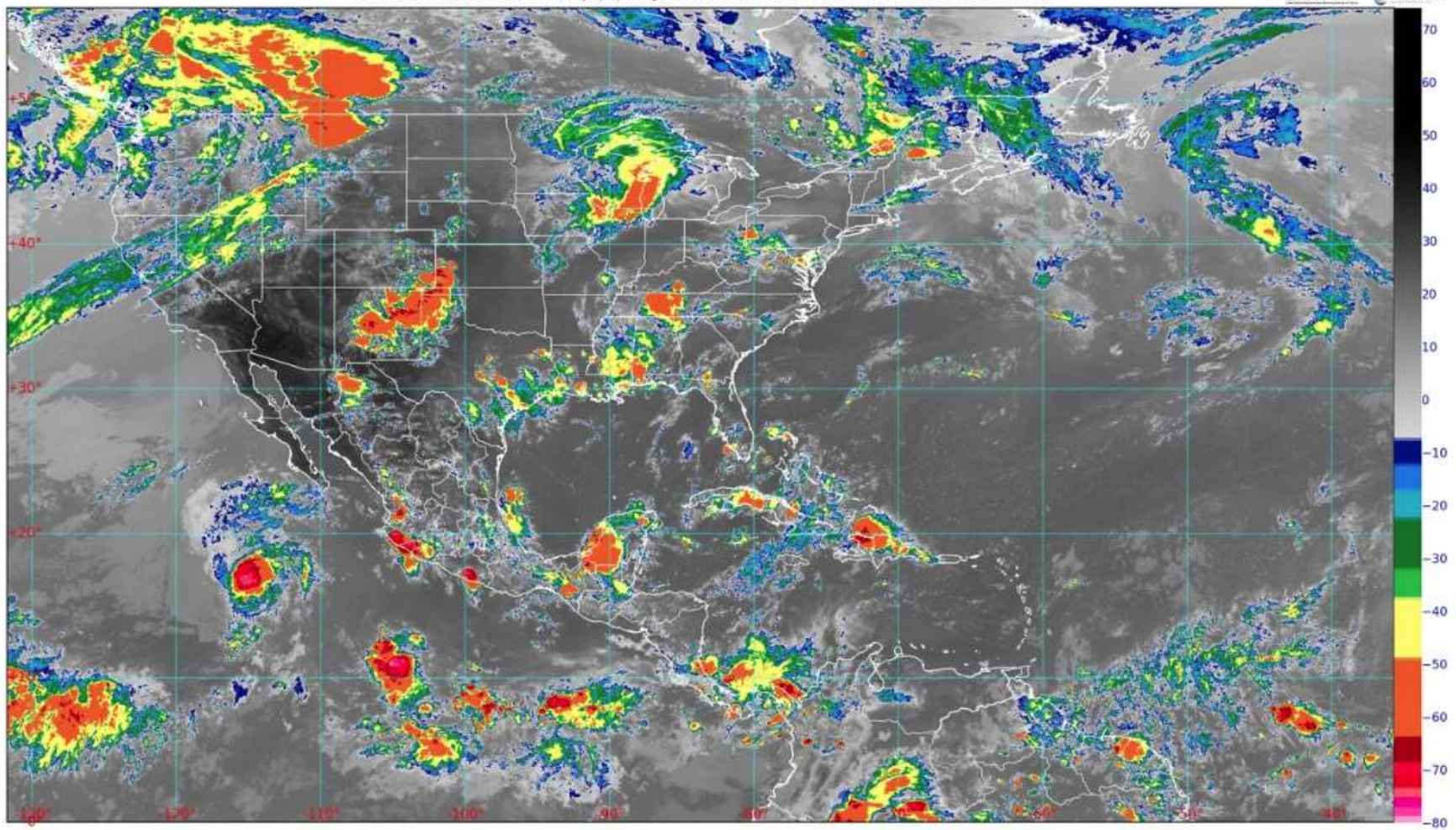
Tope de Nubes | Vapor de Agua | Visible | RGB

GOES Este, Región IV, Topes de Nubes

00:00 hrs. (UTC) Friday 28 June 2019

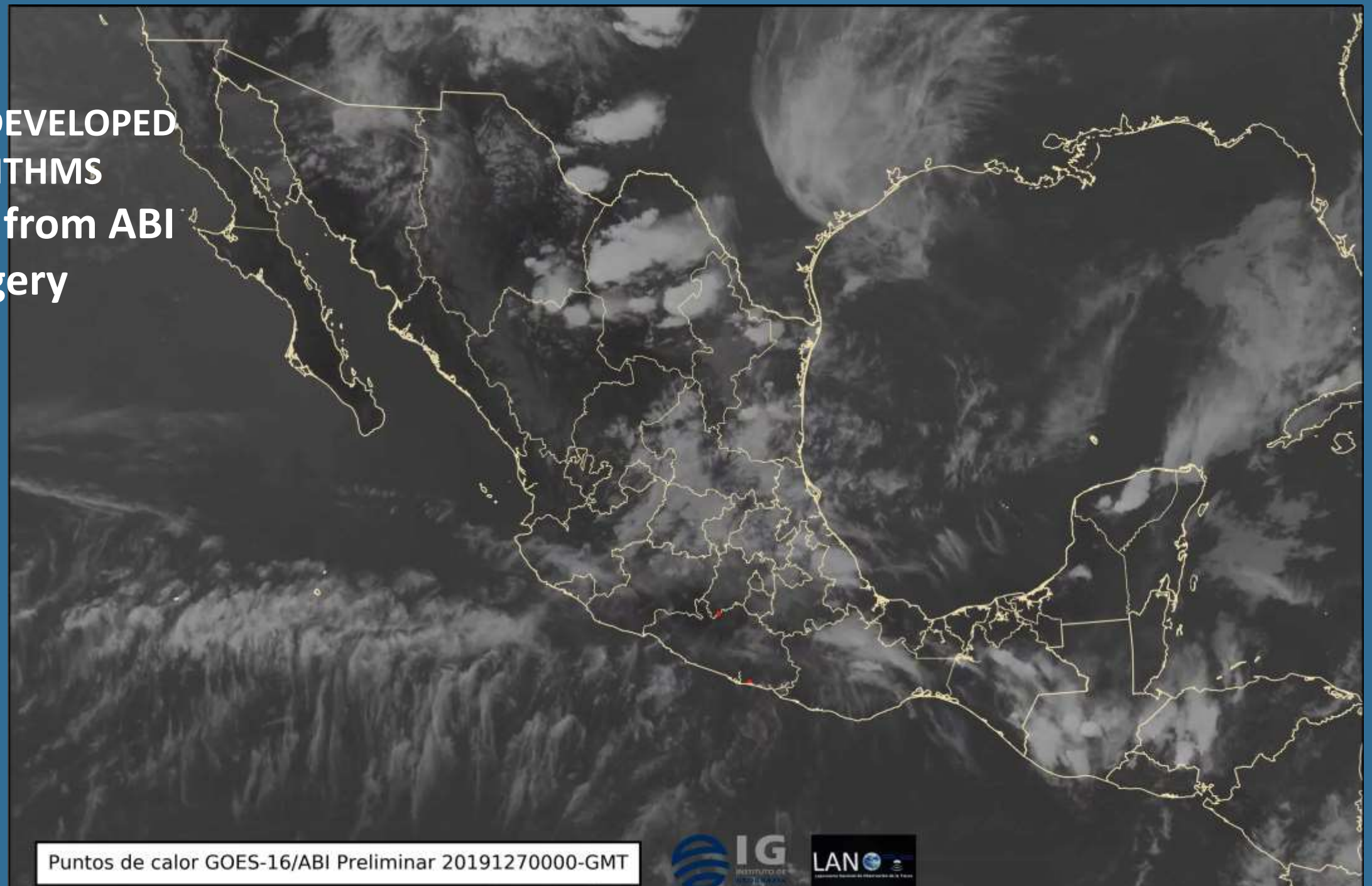
GOES-16 ABI Banda 13 Temp.[C] 28-Jun-2019 00:00:24 UTC (Local CDMX 19:00 Hrs.)

LANOT CONAGUA

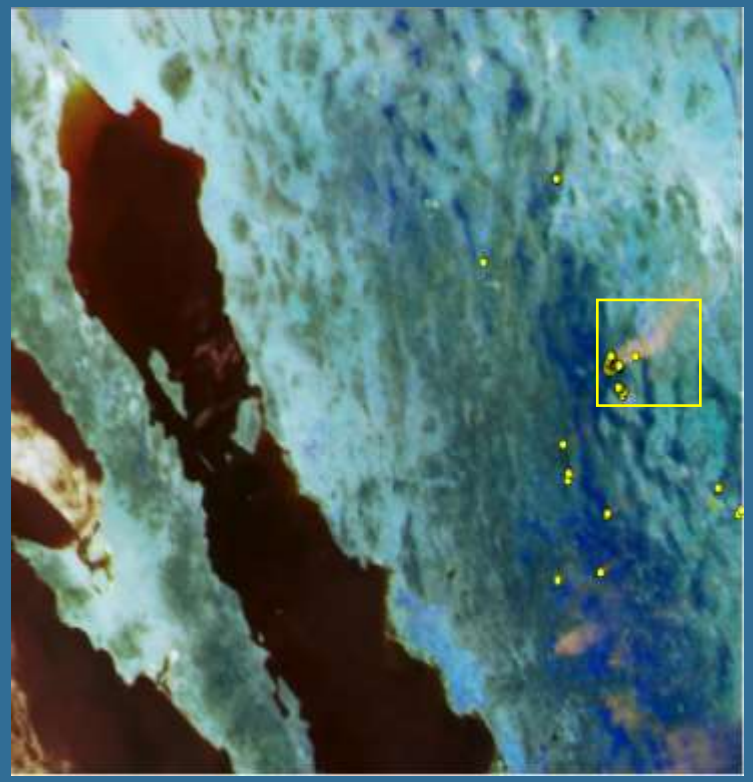


IN-HOUSE DEVELOPED ALGORITHMS

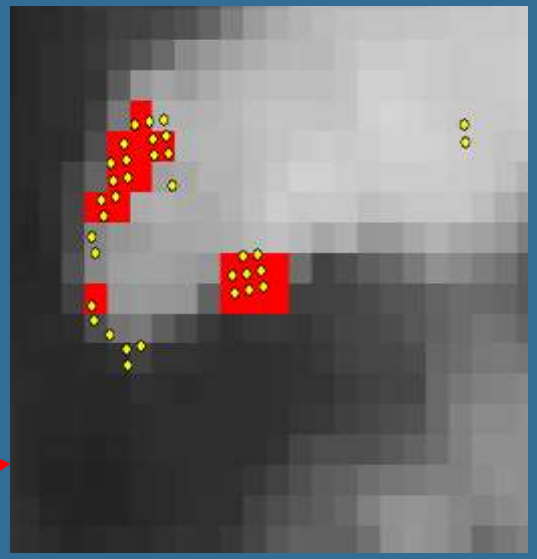
Hot Spots from ABI imagery



ABI channels + MODIS data.

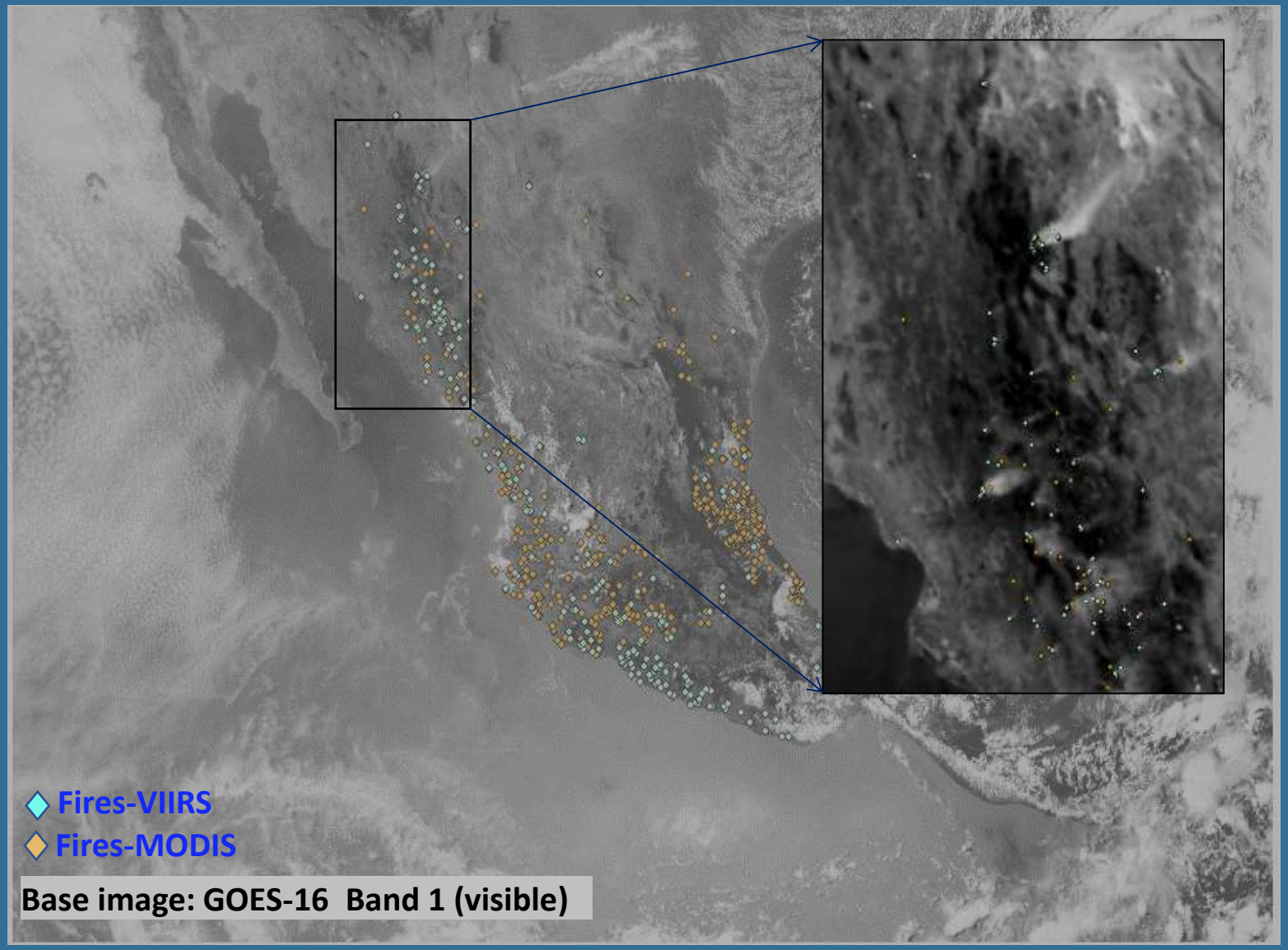


RBG 123 + MODIS Active fires (in yellow)



ABI pixels (red) identified as potential fires, yellow pixels from MODIS sensor

Ancillary dynamic data

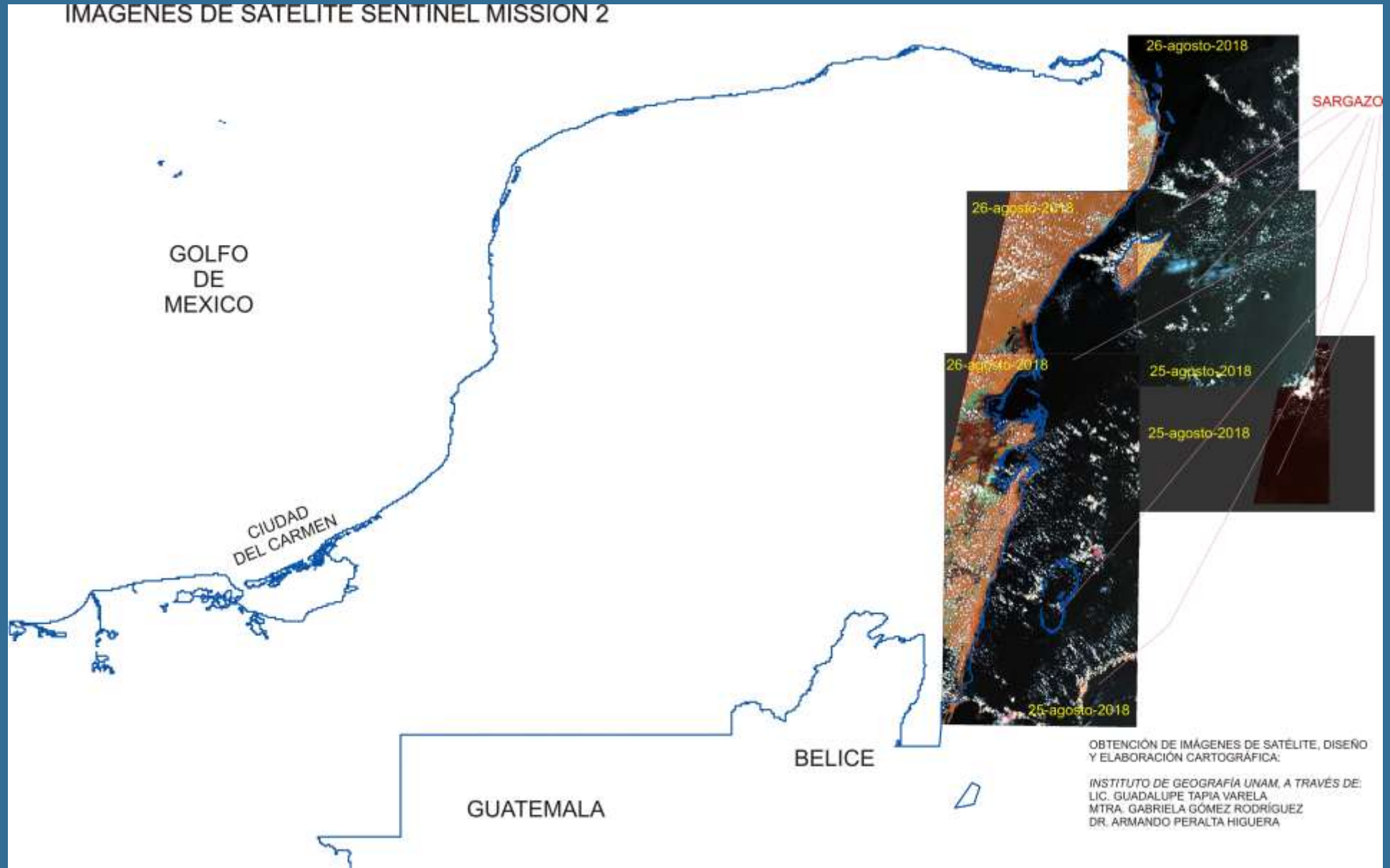


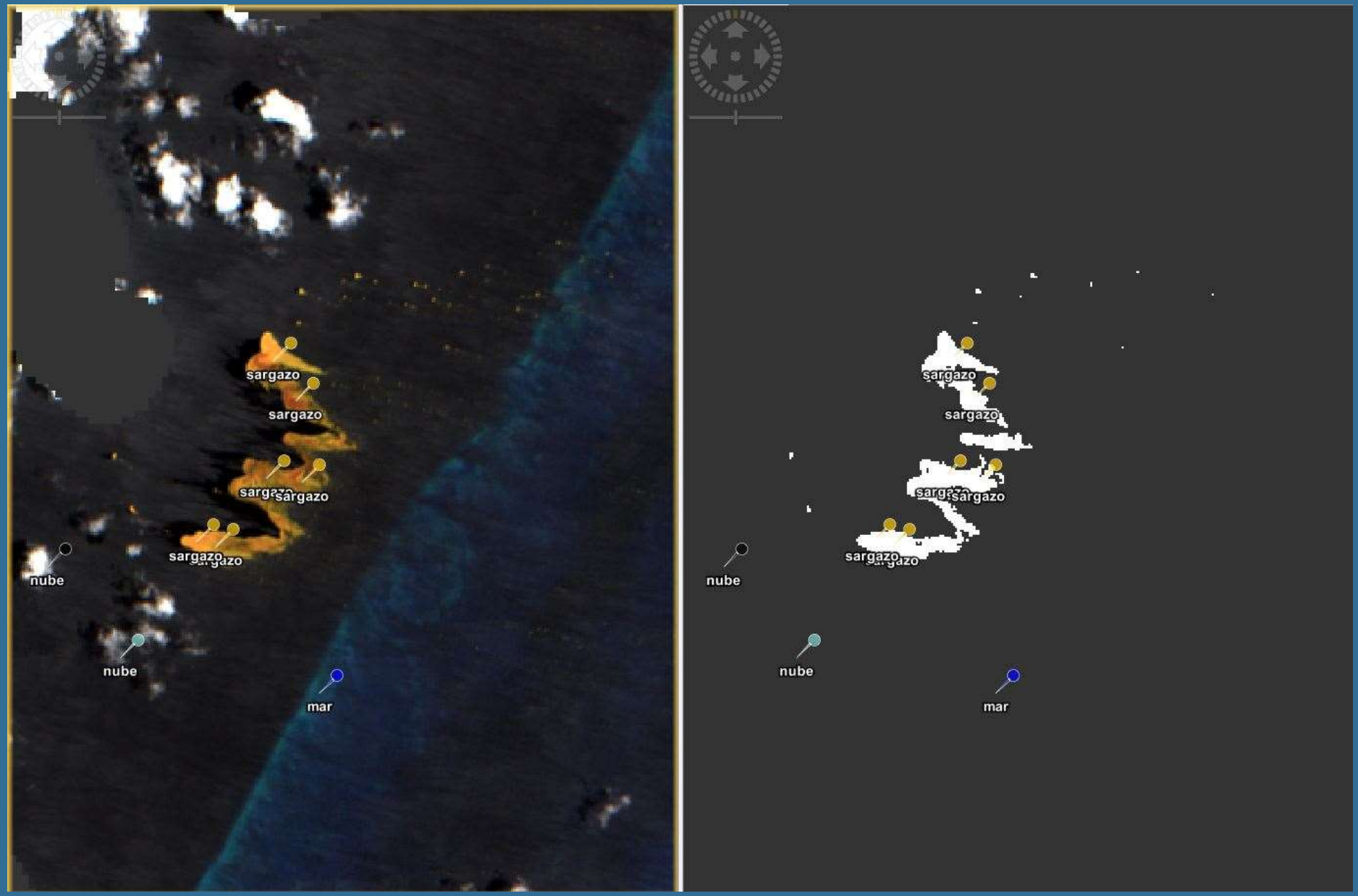
FIRMS (Fire Information for Resources Management System).

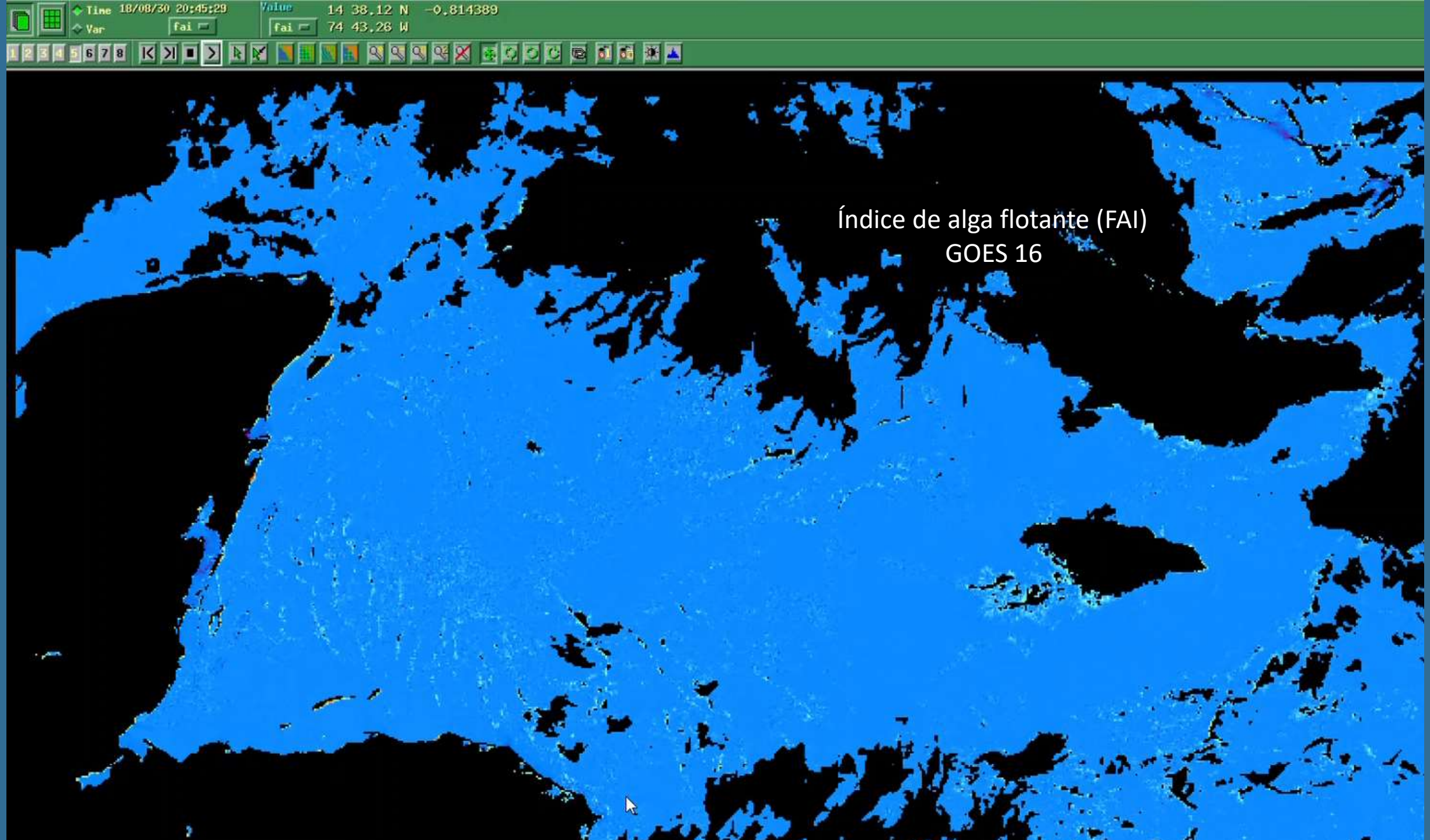
(https://earthdata.nasa.gov/data/near-real-time-data/firms


Actividad Volcánica
29 de Marzo 2019
01:03 - 04:03 GMT
Algoritmo de detección automática
de nubes de ceniza con imágenes GOES-16 ABI
LANOT/IGg/UNAM
LAN
Laboratorio Nacional de Observación de la Tierra
IG
INSTITUTO DE
GEOGRAFÍA
U N A M
CENAPRED
MÉXICO

SARGASSUM


IMÁGENES DE SATÉLITE SENTINEL MISSION 2
GOLFO
DE
MEXICO
CIUDAD
DEL CARMEN
BELICE
GUATEMALA
26-agosto-2018
SARGAZO
26-agosto-2018
26-agosto-2018
25-agosto-2018
25-agosto-2018
25-agosto-2018
OBTENCIÓN DE IMÁGENES DE SATÉLITE, DISEÑO
Y ELABORACIÓN CARTOGRÁFICA:
INSTITUTO DE GEOGRAFÍA UNAM, A TRAVÉS DE:
LIC. GUADALUPE TAPIA VARELA
MTRA. GABRIELA GÓMEZ RODRÍGUEZ
DR. ARMANDO PERALTA HIGUERA


sargazo
sargazo
sargazo
sargazo
sargazo
nube
nube
mar
sargazo
sargazo
sargazo
sargazo
nube
nube
mar


Time 18/08/30 20:45:29
Var
fai
Value
14 38.12 N -0.814389
fai
74 43.26 W
Índice de alga flotante (FAI)
GOES 16

CLIMATE CHANGE

- **DATA CUBE and other techniques with diverse datasets are employed to validate predictive models.**
- **Hydrometeorological phenomena are stored: cold fronts, tropical depressions, tropical storms, hurricanes and forest fires**
- **Images, and animations**
- **METADATA**
- **Collaborative efforts with some institutions: NOAA, NASA, U. OF WISCONSIN, INPE, and ISRO,**

ACCESS TO OUR IMAGE DIRECTORIES

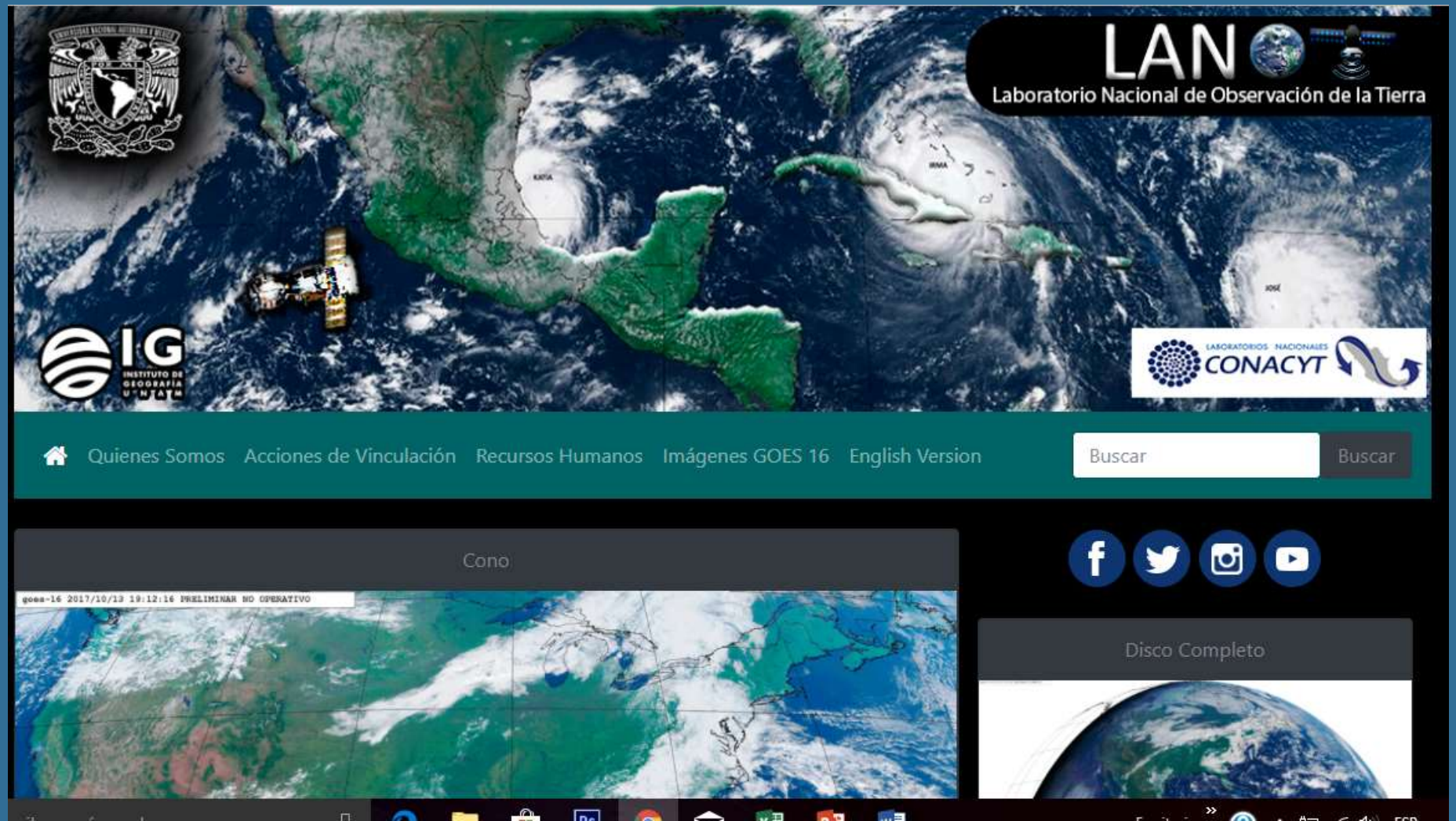
- Users access to our image directories 16,700 times per week (Sep 2019), not considering the Navy (They send their products directly), neither direct accesses by Geography Institute researchers.

BY TERMINAL CONNECTION

% sftp usuarioext@132.247.103.143

Web SITE LANOT: www.lanot.unam.mx

visits since march 2018: 359,715



Conclusions

Processed images are delivered in almost real-time to civil protection and other institutions in charge of issuing early warnings to reduce risks to population

Historic images and other datasets are stored for long-term analysis, and climate modeling development.

THANKS!

National Laboratory for Earth Observation

MEXICO

lanot@igg.unam.mx
http://www.lanot.unam.mx

LAN
Laboratorio Nacional de Observación de la Tierra