

Mapping Oil with SAR

CMOD5 + TCNNA (SAR Products) can be used to distinguish between low wind and surfactants

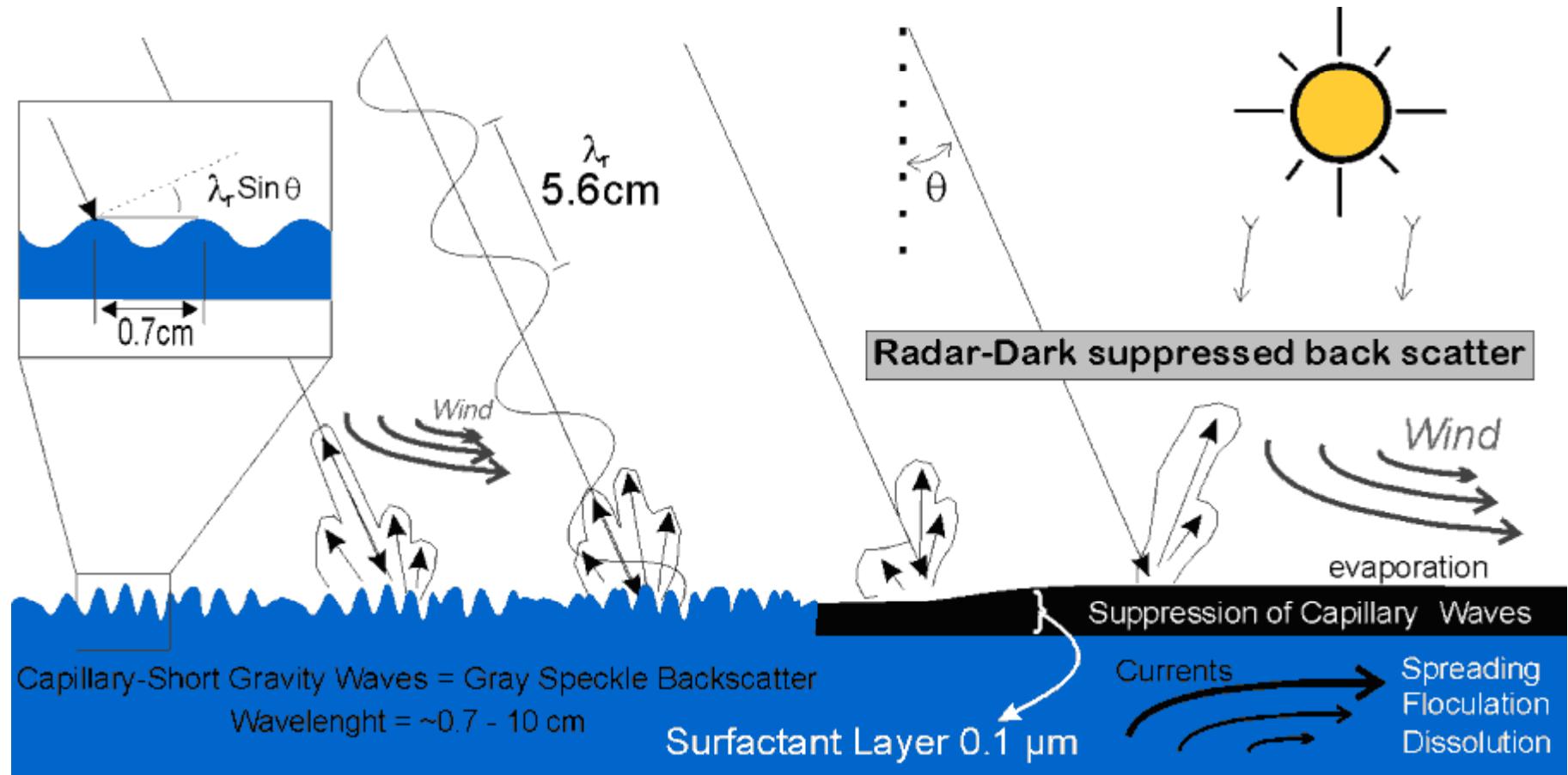
Updates on the Deep Horizon Oil Spill



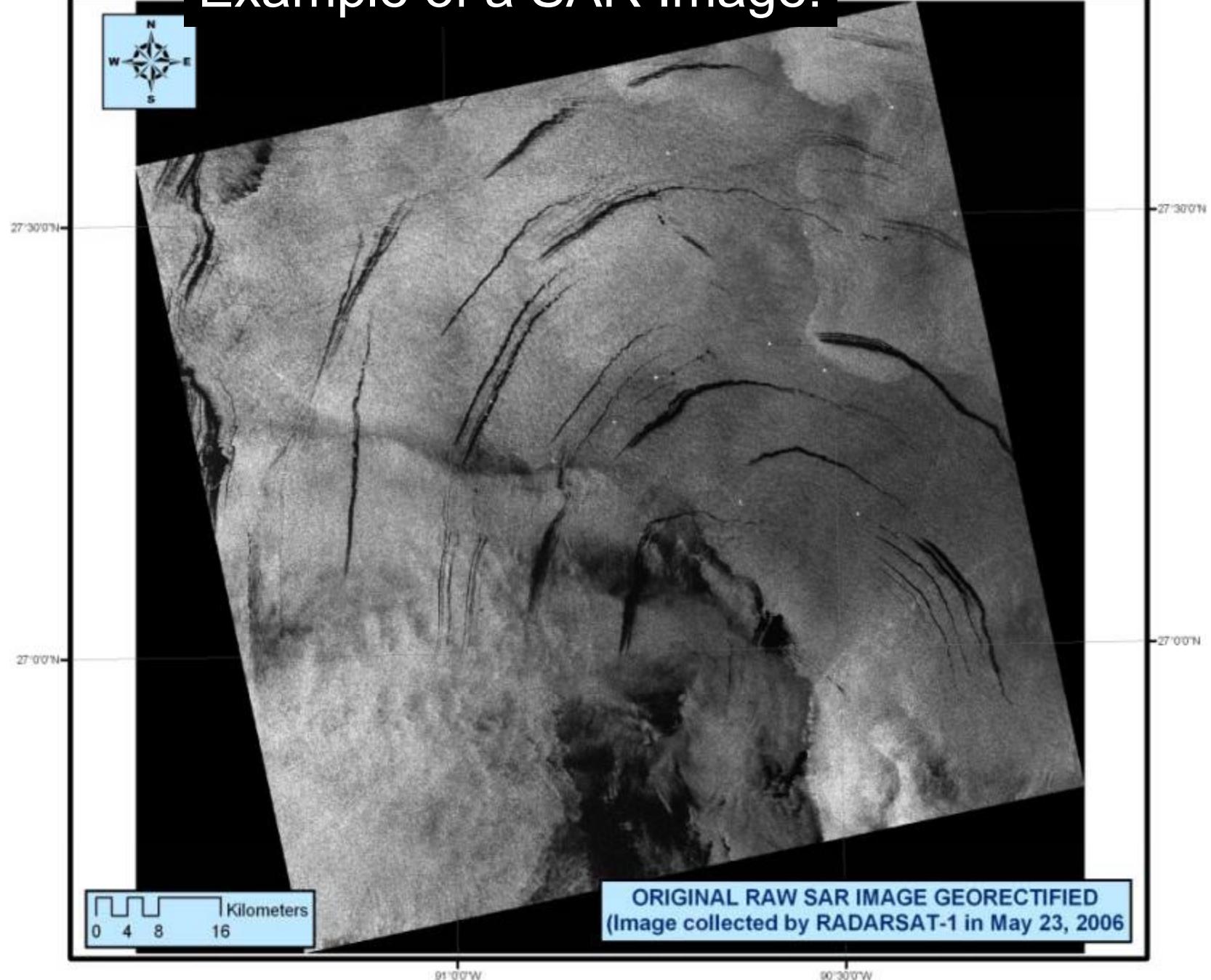
Oscar Garcia Pineda
Florida State University



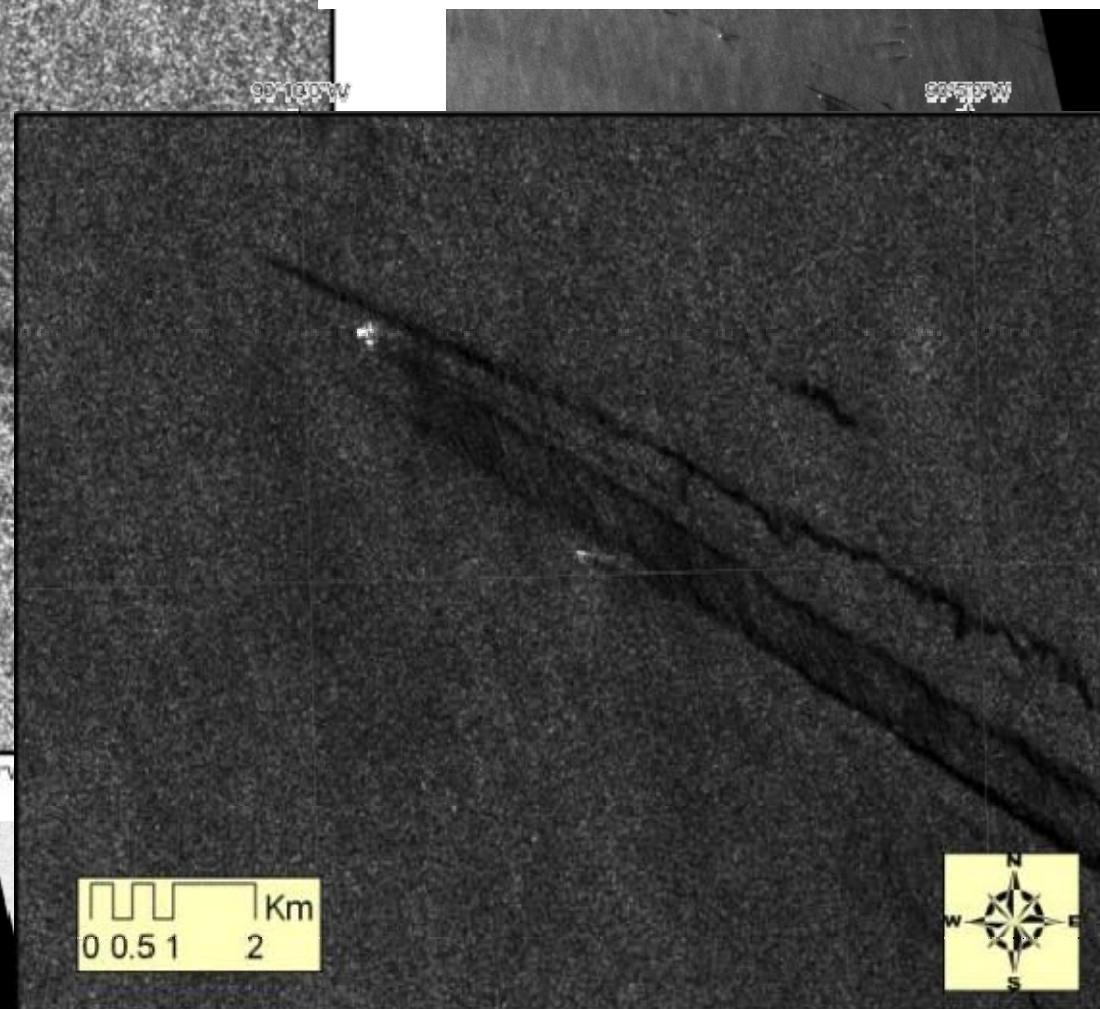
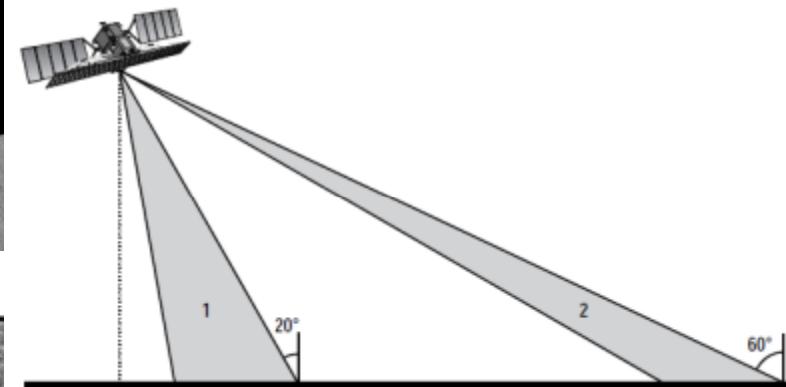
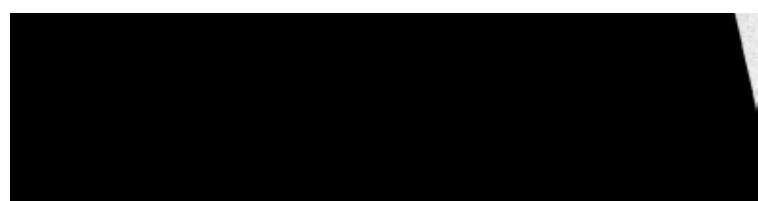
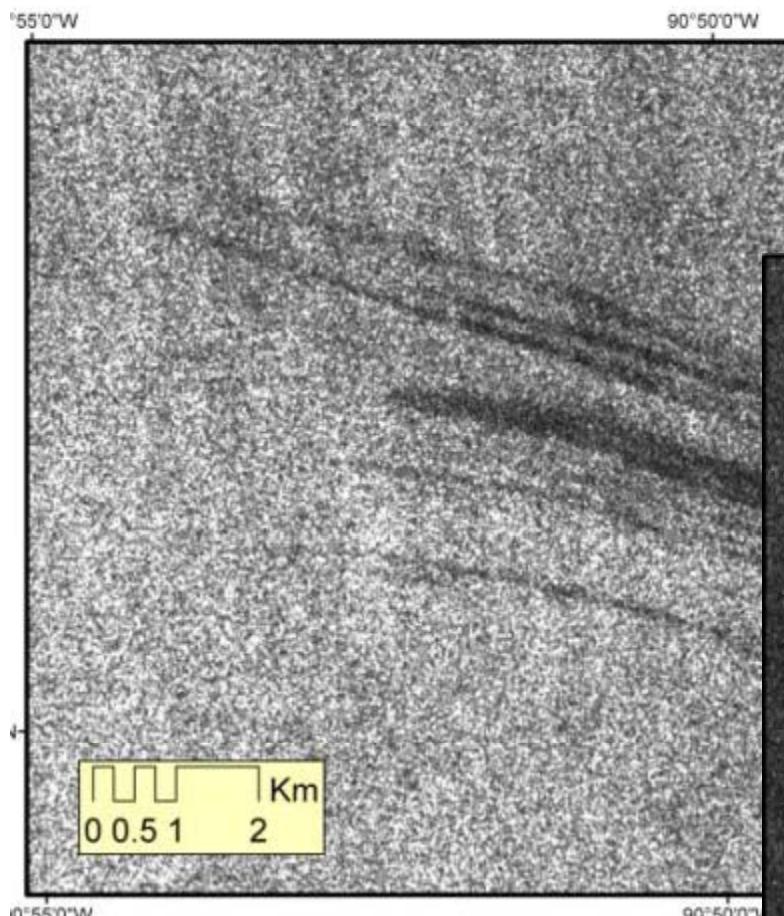
Oil Slicks in the Water and Related Processes



Example of a SAR Image:



Complexity of SAR images



Integration of Satellite Remote Sensing Data with Ancillary Data

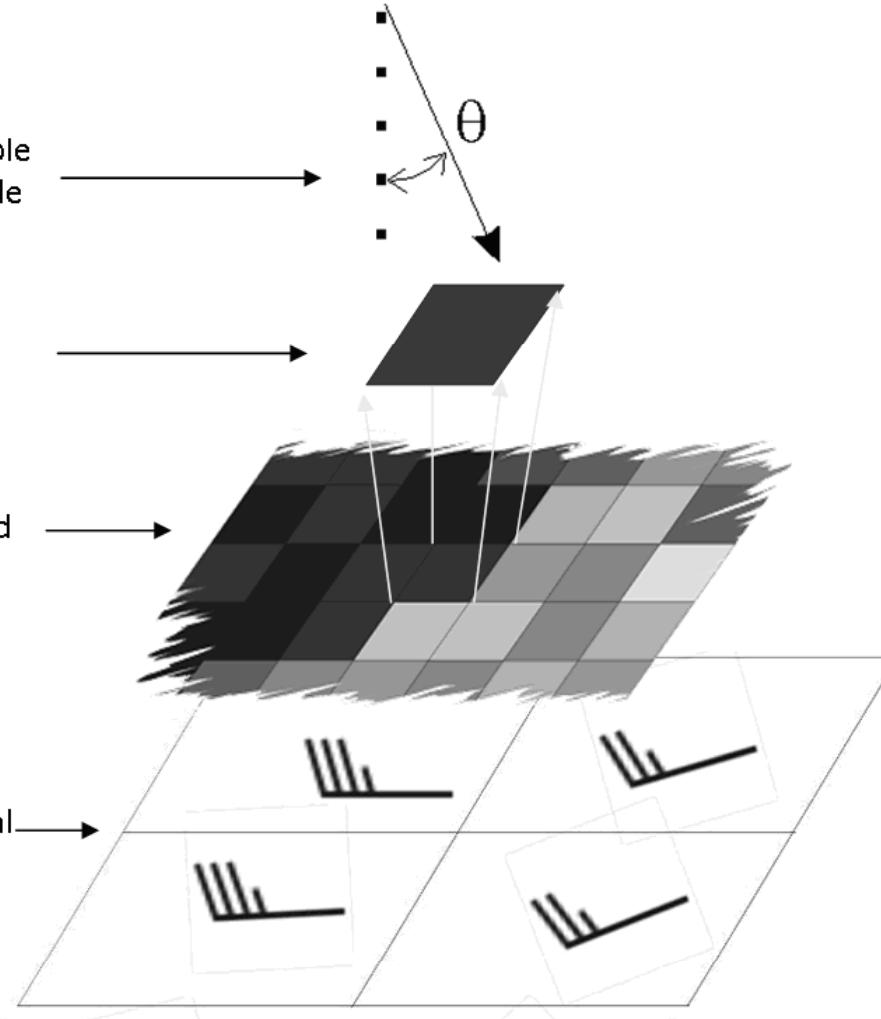
Four types of Data Assimilated:

Satellite Variable
Incidence Angle

Pixel Values

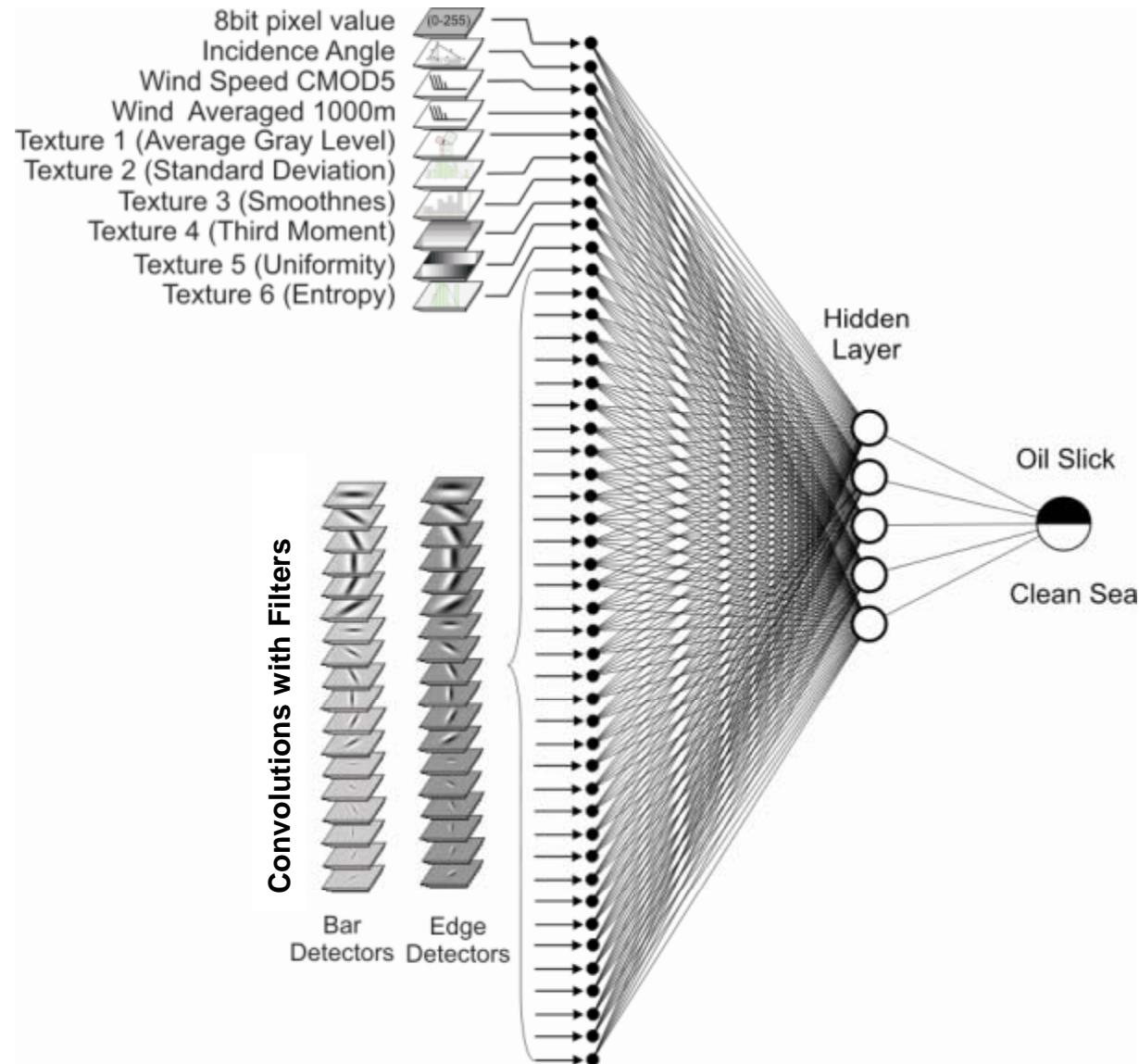
Neighborhood

Environmental
Data

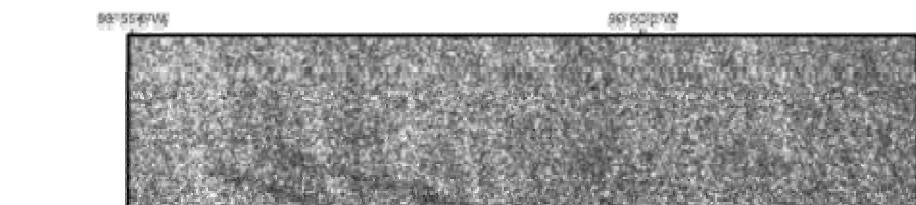


A neural network program is used to fit a function of many variables

Textural Classifier Neural Network Algorithm TCNNA



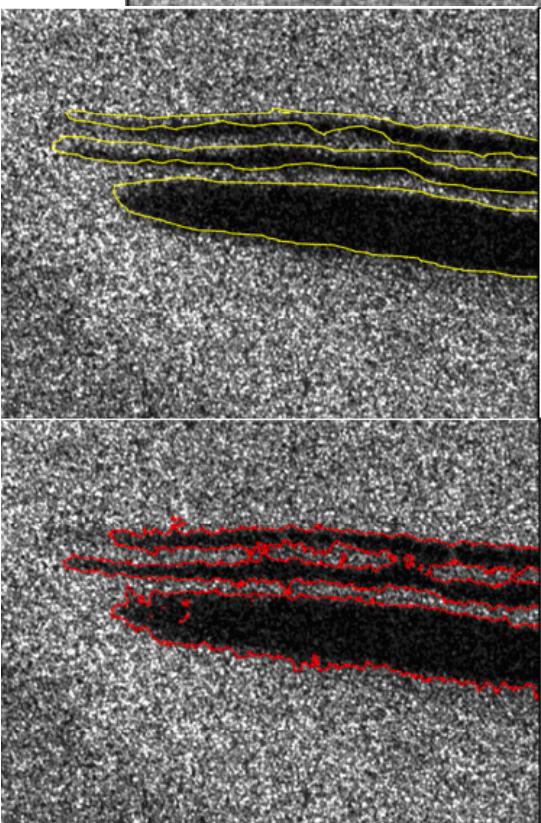
Original SAR Data



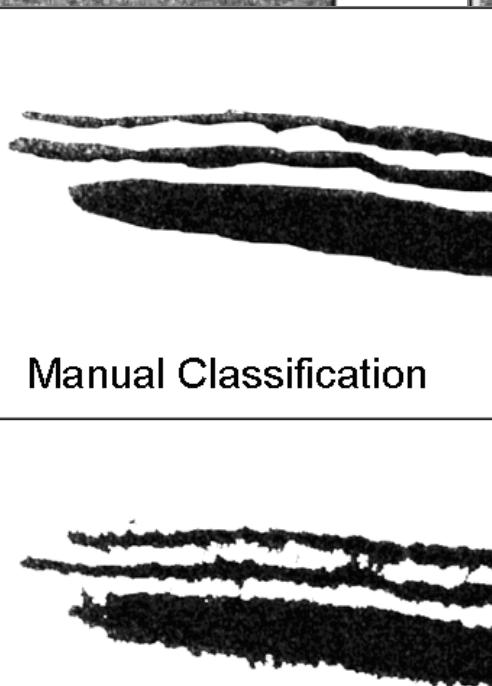
TCNNA Results



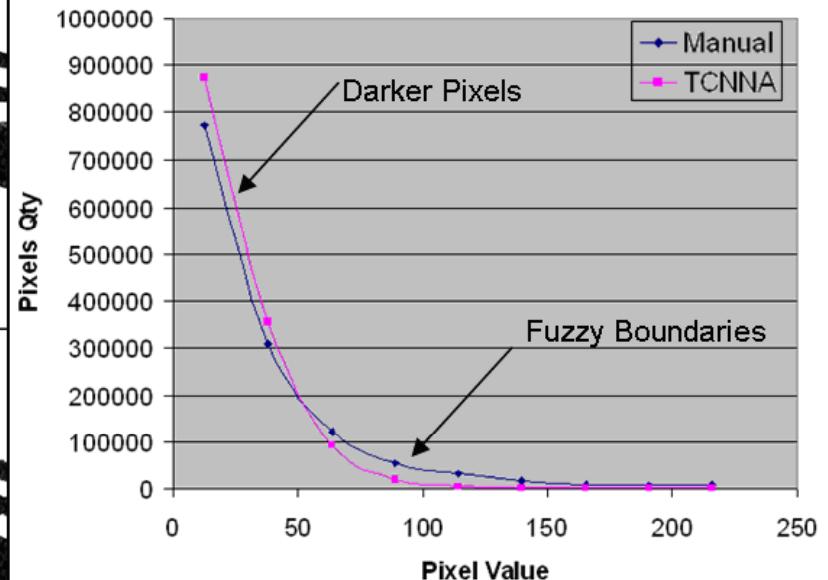
Manual Classification



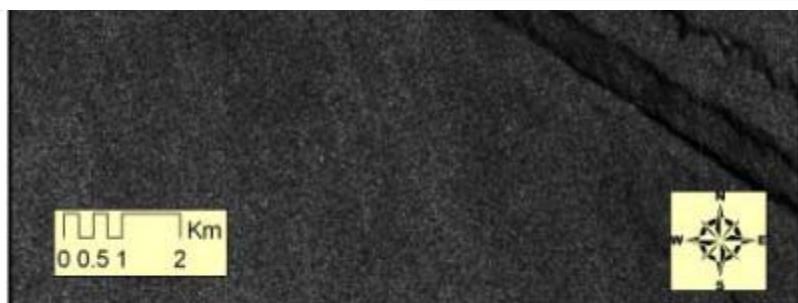
TCNNA Segmentation

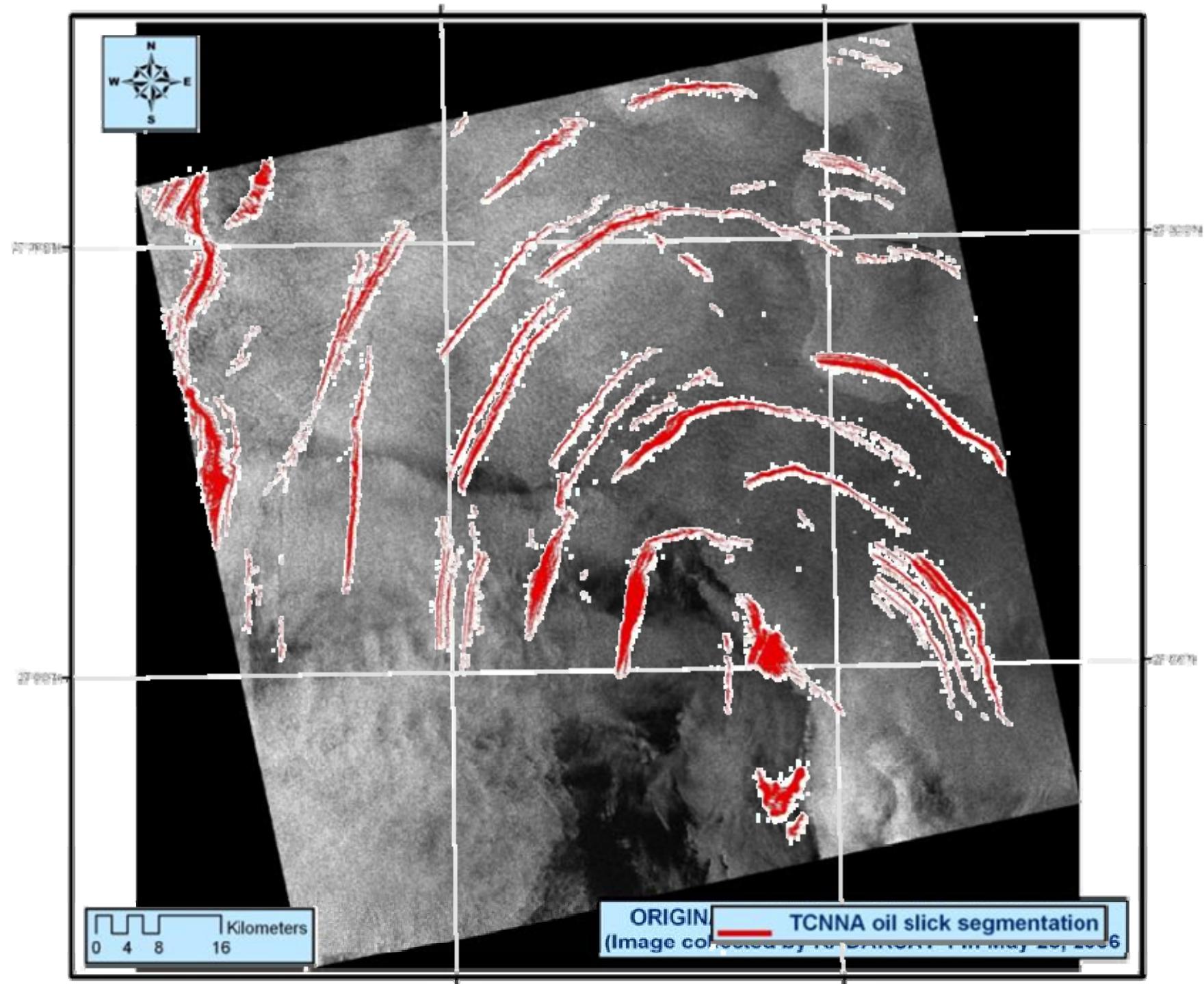


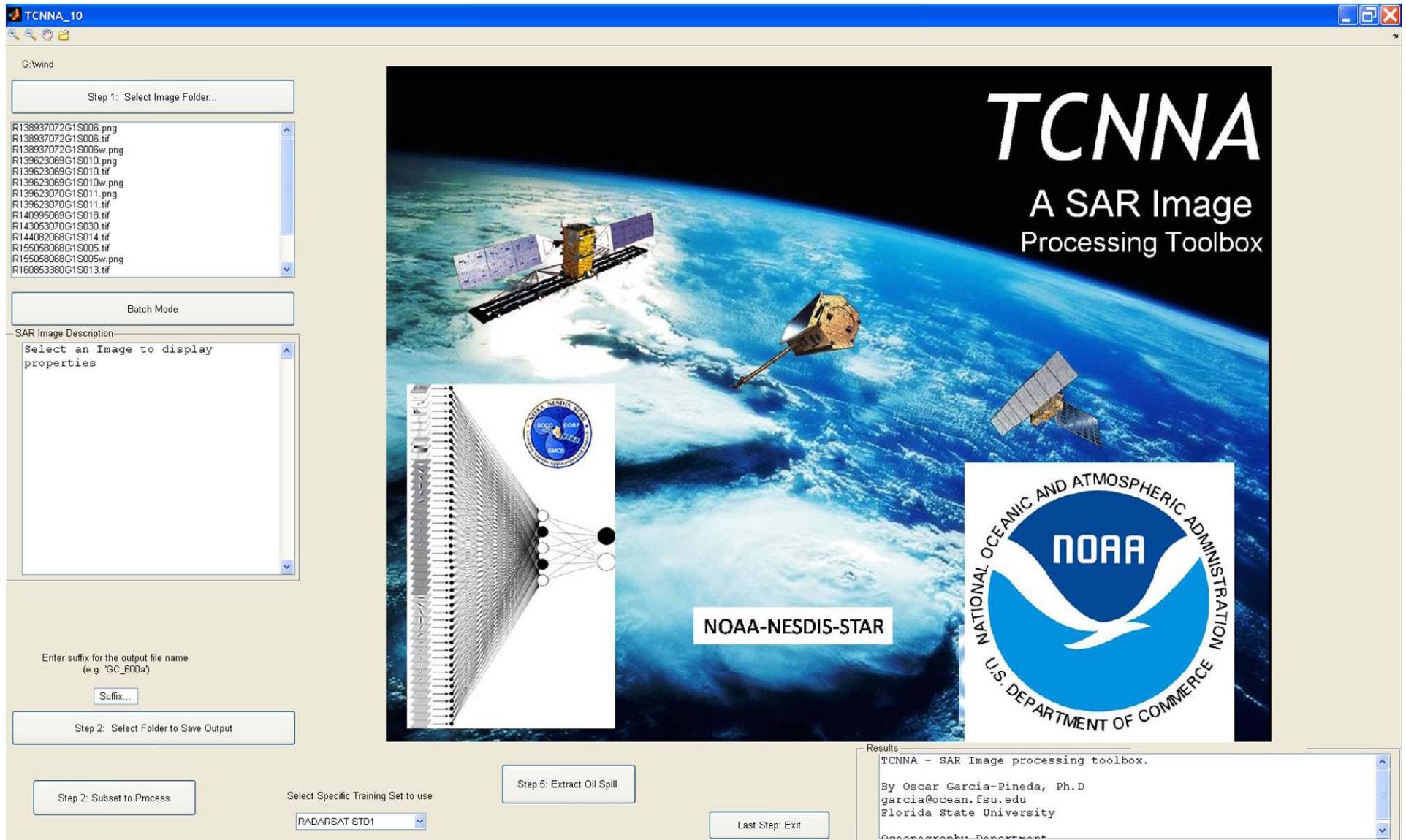
Oil Slick Segmentation (Manually vs TCNNA)

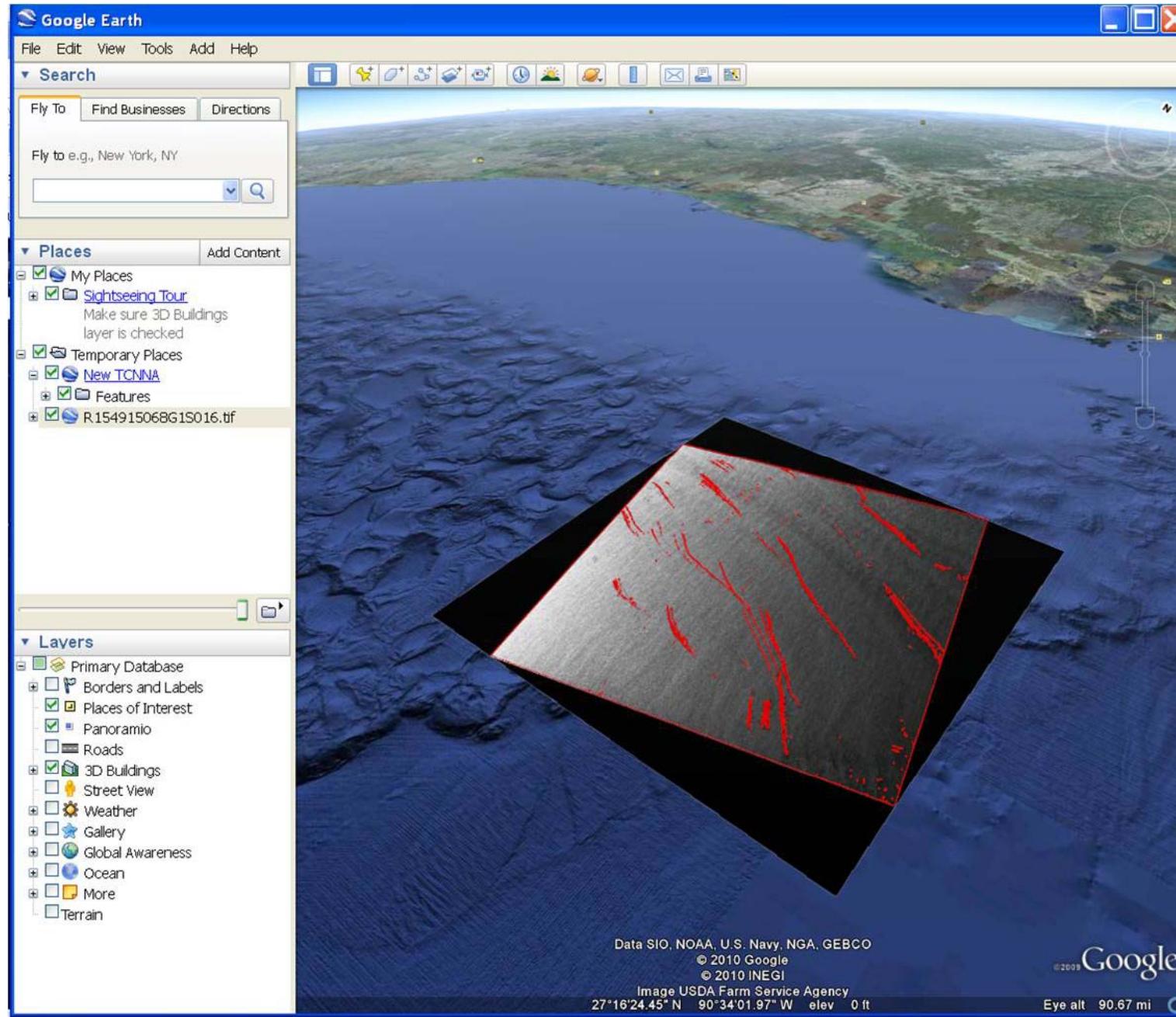


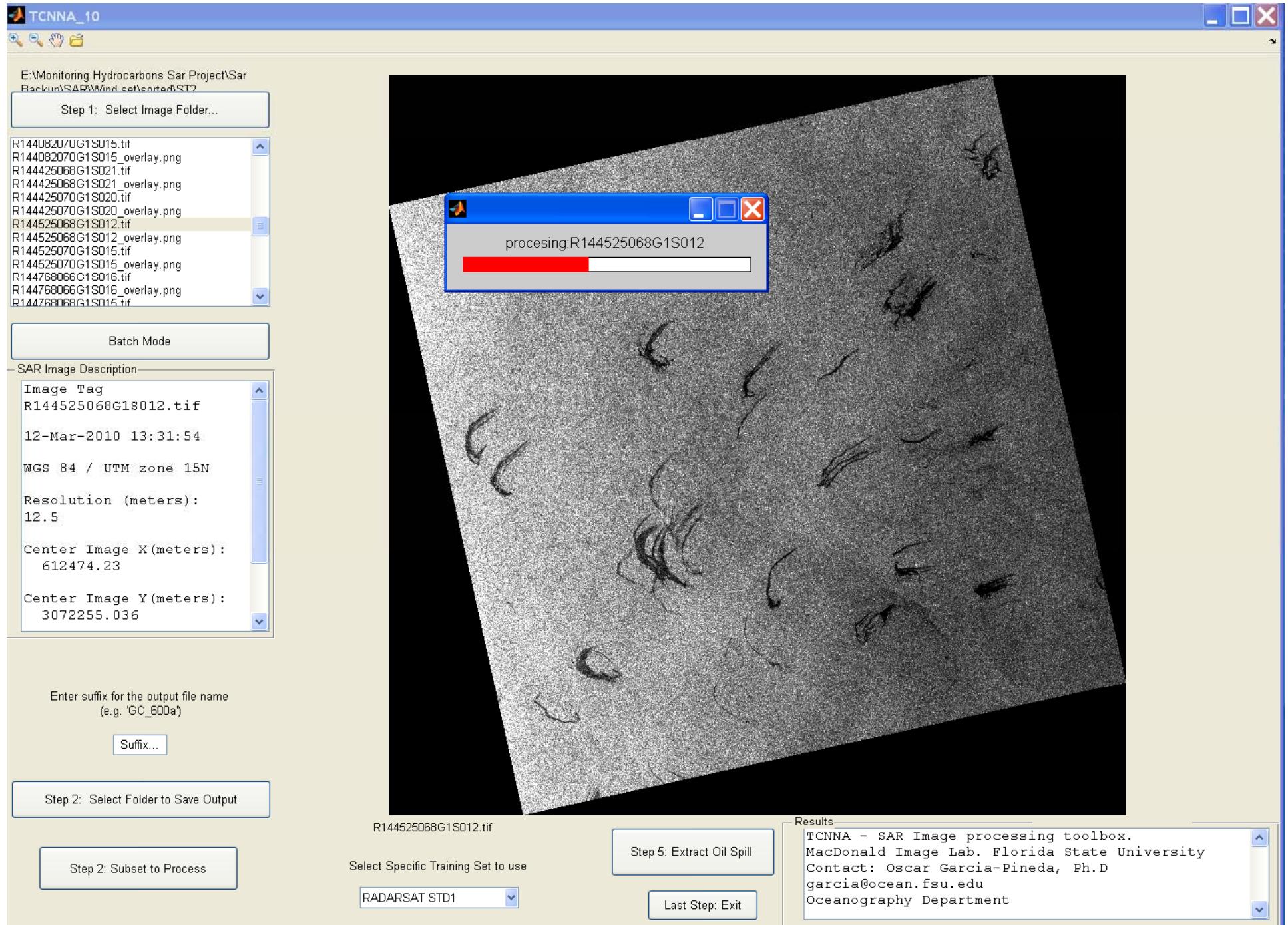
	Mean	Std Dev	Max	Min	Total Pixels	Area
Manual	36.9563	49.4843	254	0	1172929	183.27km
TCNNA	30.6748	46.6957	254	0	1194703	186.67km



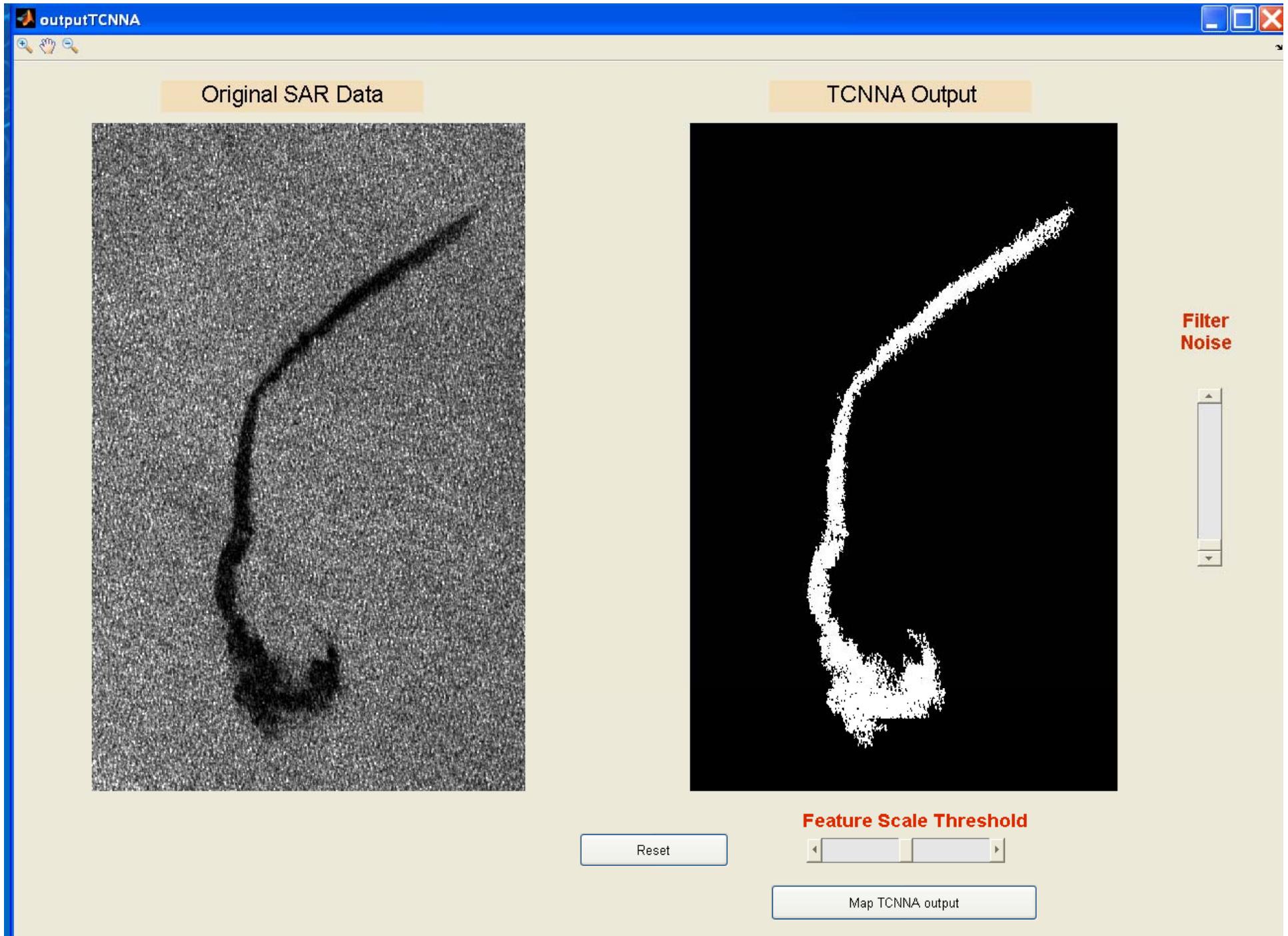


















Oil Spill Academic Task Force (OSATF) - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://oilspill.fsu.edu/

Oil Spill Academic Task Force (OSATF)

Oil Spill Academic Task Force

Navigate:

- Tracking the Spill
- Projections
- Ecological Issues
- Economic Implications
- Legal Issues
- Risk Management
- Images and Maps
- Community Outreach
- Useful Links
- News and Media
- OSATF Contacts
- Home

OSATF Expert Finder Portal
to find scientists and scholars
in a particular area of expertise

Scientific Concerns
Concerns regarding
mid-water transport of oil
from well

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Academic Task Force Formed to Help With Response to Oil Spill in the Gulf of Mexico

The Oil Spill Academic Task Force (OSATF) will bring together resources of Florida's academic institutions to assist the state of Florida and the Gulf region in preparing for and responding to the Deepwater Horizon oil spill. The task force consists of scientists and scholars working in collaboration with colleges from the State University System as well as private colleges.

Initiatives of the OSATF include:

- coordinating with state and other academic resources in the Florida University system;
- measuring and modeling the risk trajectory of oil escaping from the well;
- conducting pre-spill and post-spill assessments of coastal ecological communities;
- planning logistics and evaluating risk; and
- coordinating citizen response efforts (e.g., training and health protection). An email list service and comprehensive website will soon be established to facilitate information dissemination.

This website is designed to provide information on the task force efforts and links to partners and resources.

Partner Institutions
The following partner institutions will coordinate with the Florida Department of Environmental Protection (DEP) and other state and federal agencies.

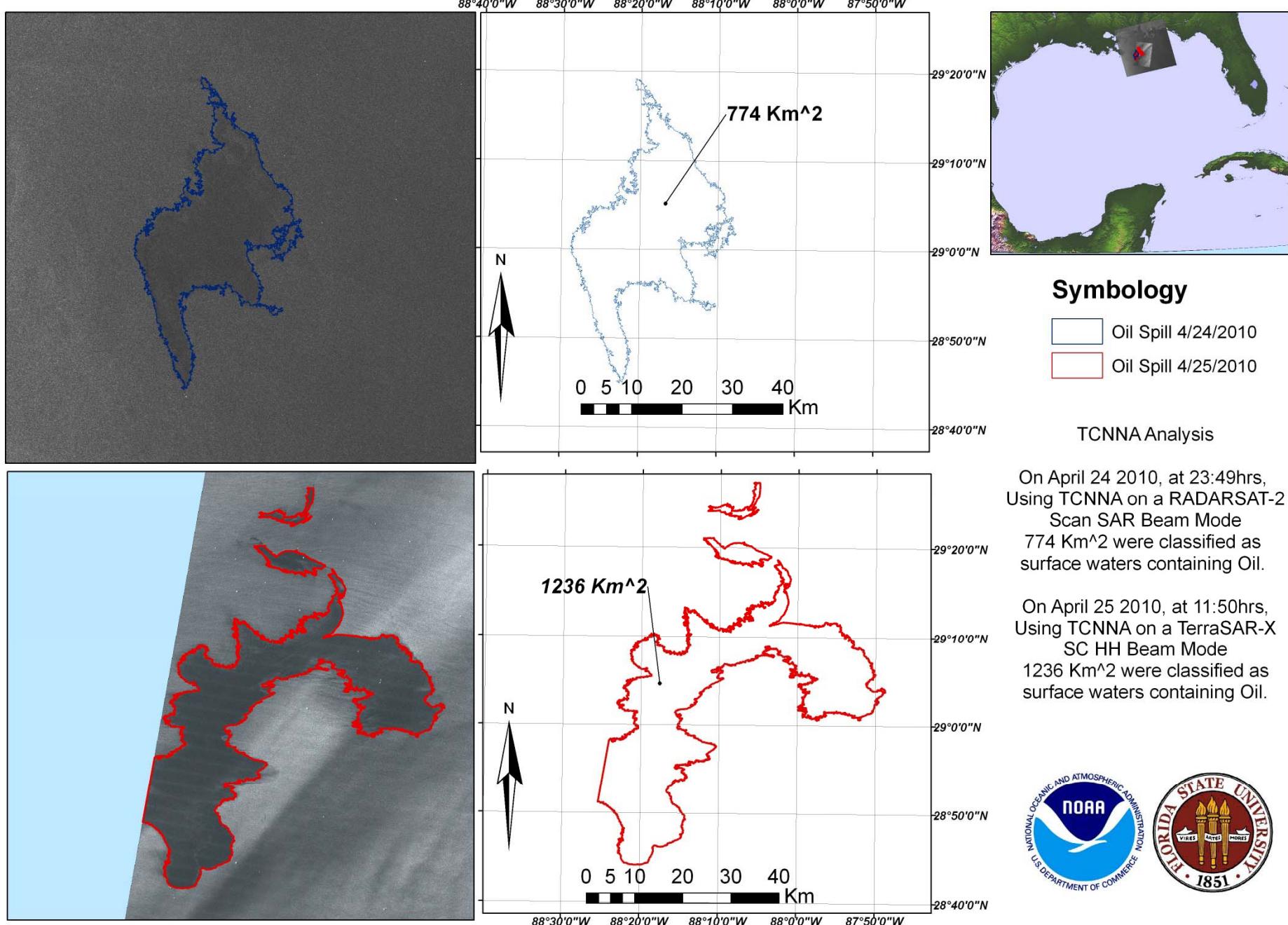
- Florida A&M University
- Florida Atlantic University
- Florida Gulf Coast University
- Florida Institute of Technology
- Florida International University
- Florida State University
- Jacksonville University
- New College of Florida
- Nova Southeastern University
- University of Central Florida
- University of Florida
- University of Miami
- University of North Florida
- University of South Florida

Information and Media
Governor Crist has declared a state of emergency for the following coastal counties in Florida: Franklin, Wakulla, Jefferson, Taylor, Dixie, Levy, Citrus, Hernando, Pasco, Pinellas, Hillsborough, Manatee and Sarasota.

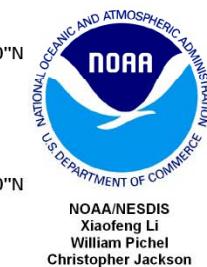
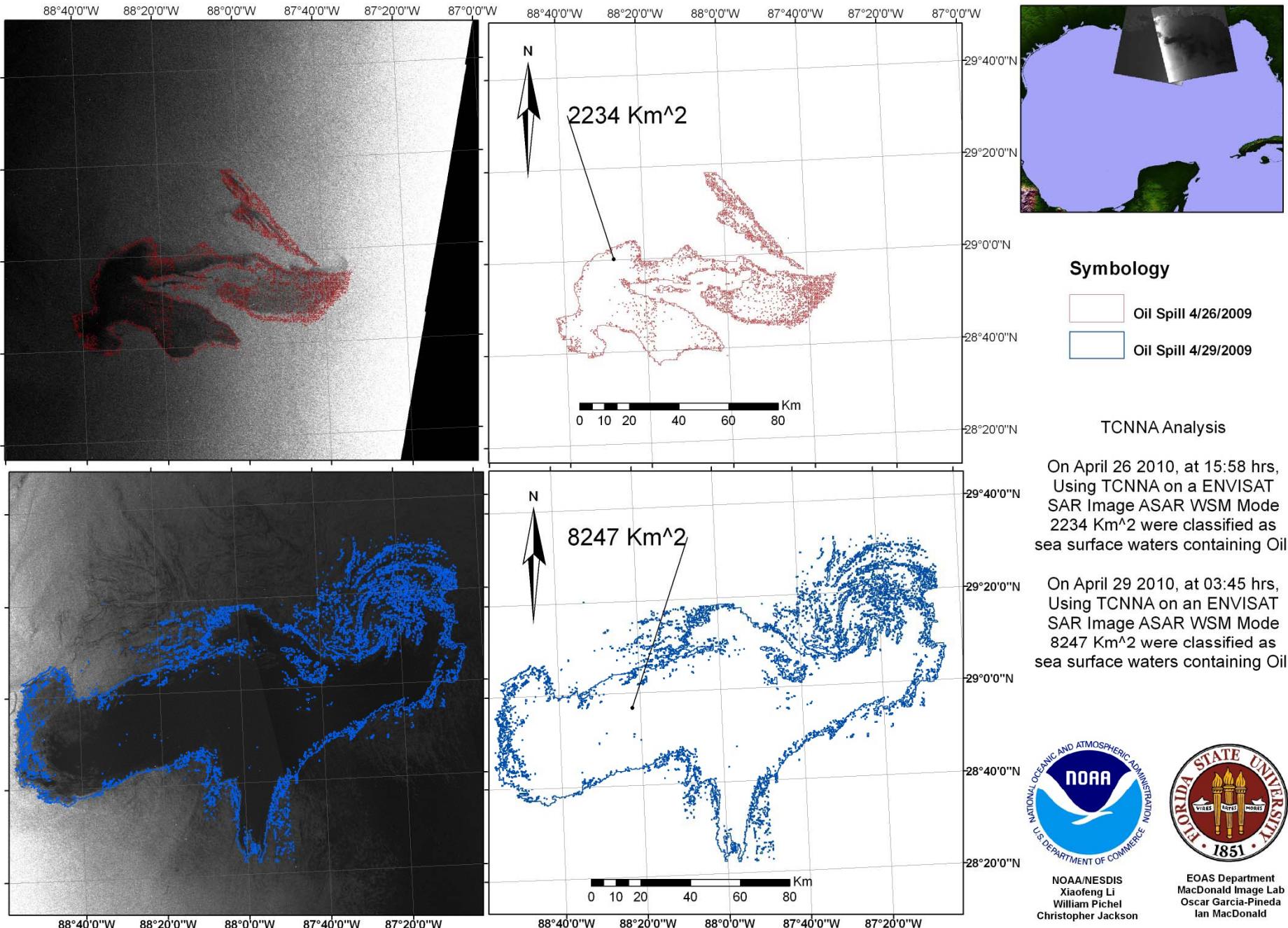
The Florida Department of Environmental Protection (DEP) is the lead agency in Florida's response. The DEP Office of Coastal and Aquatic Managed Areas (OCAMA) has been charged with leading with the Florida effort of oil spill preparation and response.

The Coast Guard Sector Mobile Area Contingency Plan, created with assistance from Florida DEP and FWC-PWR staff, can be viewed [here](#).

RADARSAT-2 (04/24/2010) & TerraSAR-X (04/25/2010)



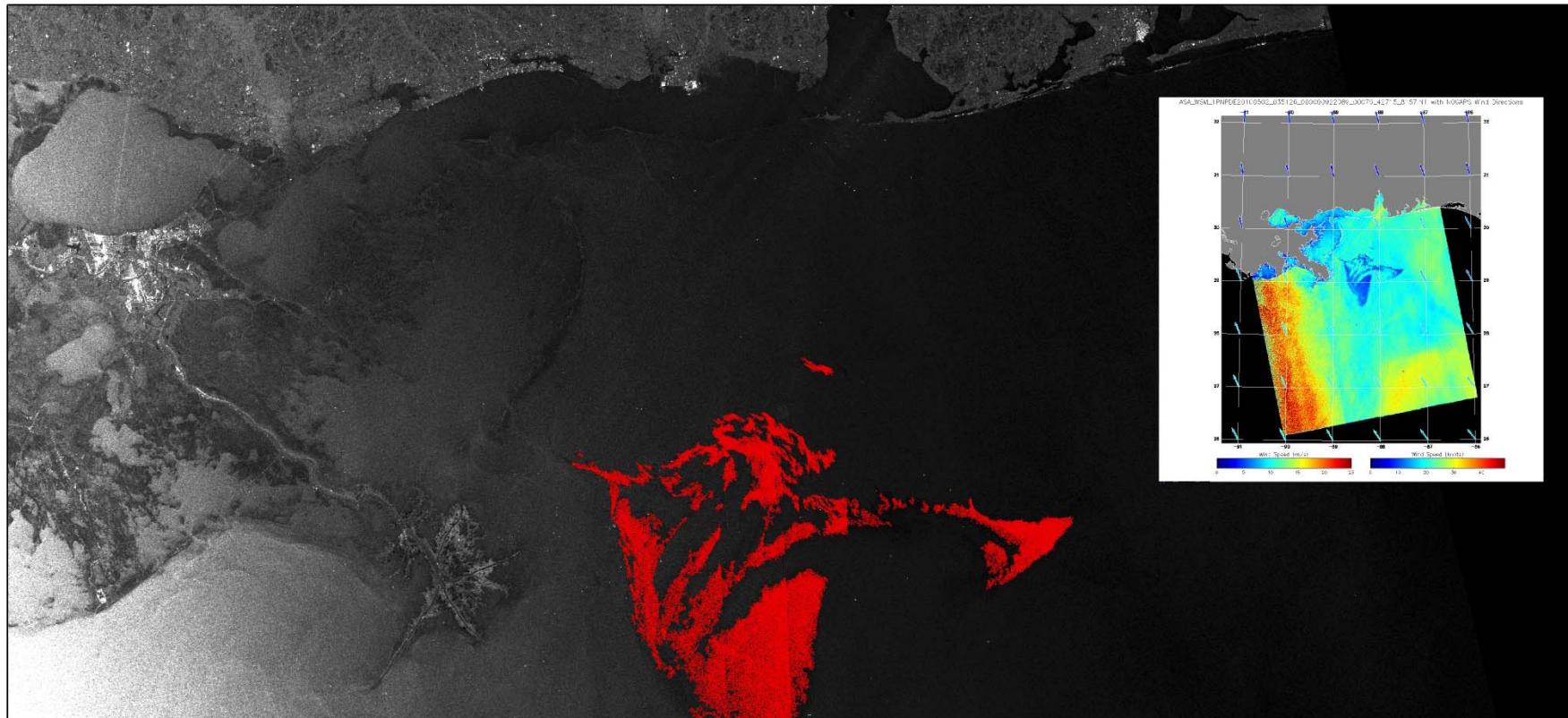
TCNNA Analysis on ENVISAT SAR (04/26/2010 & 04/29/2010)



EOAS Department
MacDonald Image Lab
Oscar Garcia-Pineda
Ian MacDonald

NOAA/NESDIS
Xiaofeng Li
William Pichel
Christopher Jackson

TCNNA Analysis GOM Oil Spill. Envisat May 2



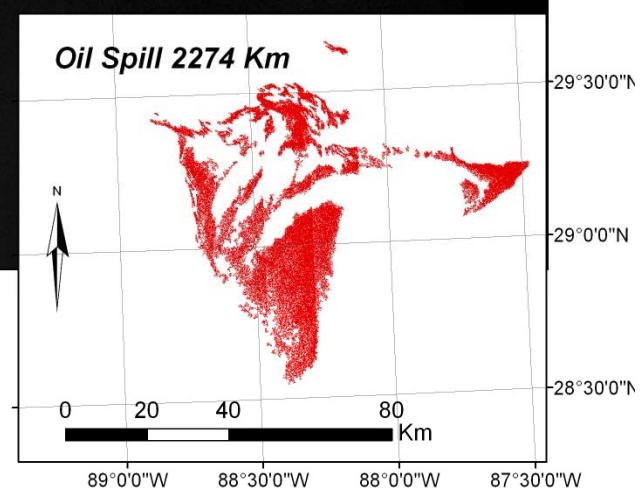
Symbology



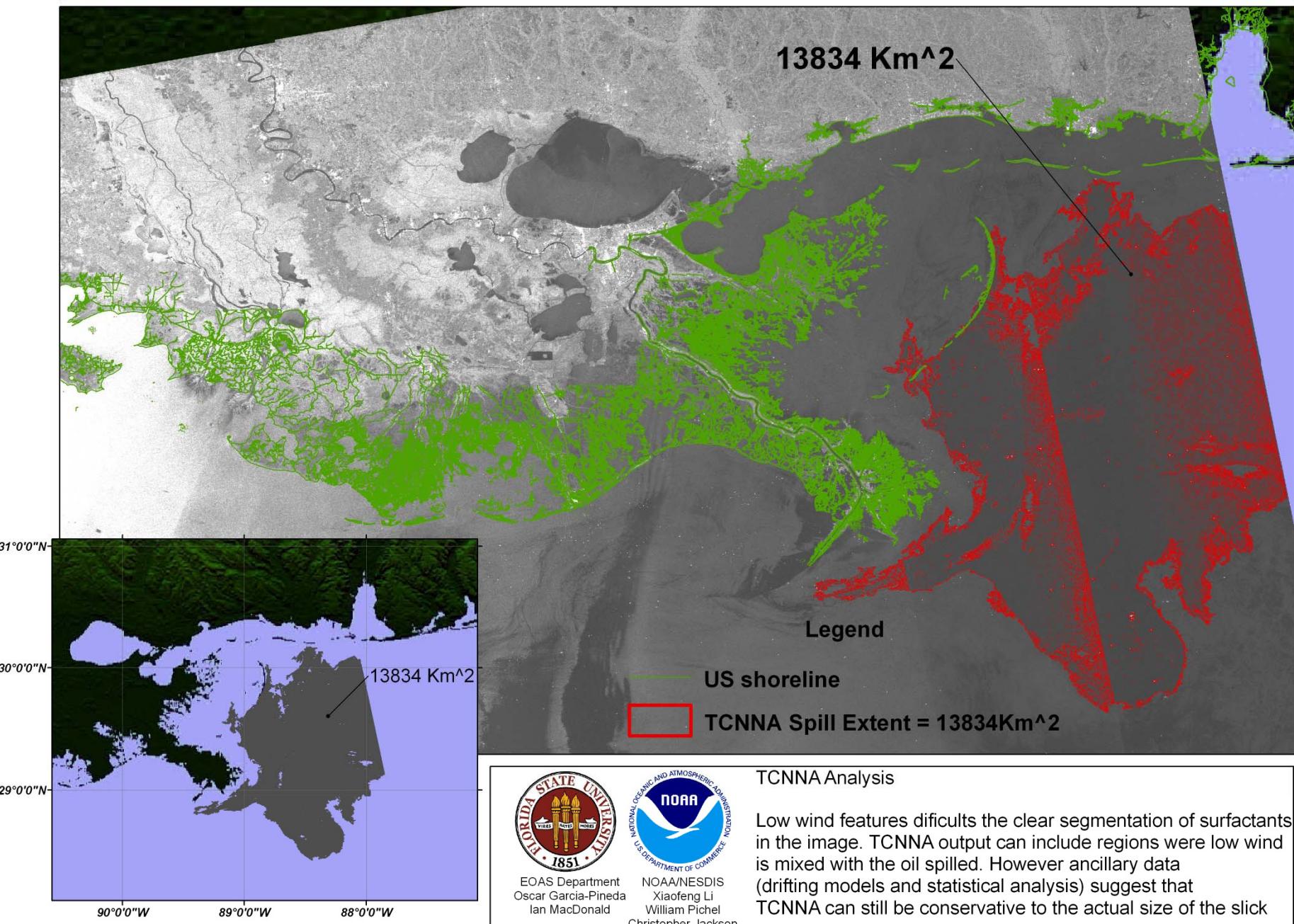
Analysis

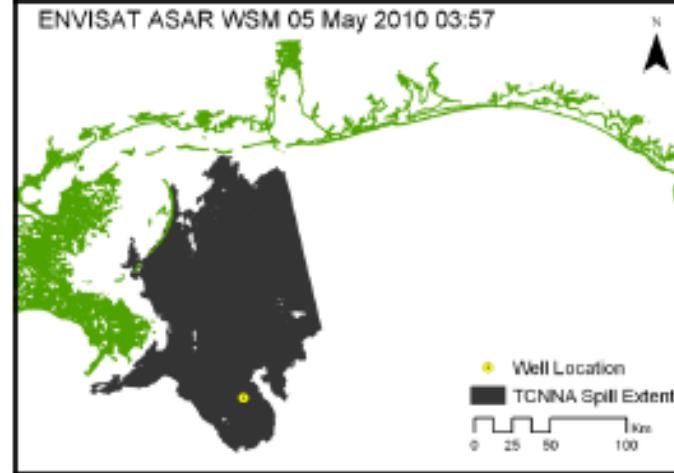
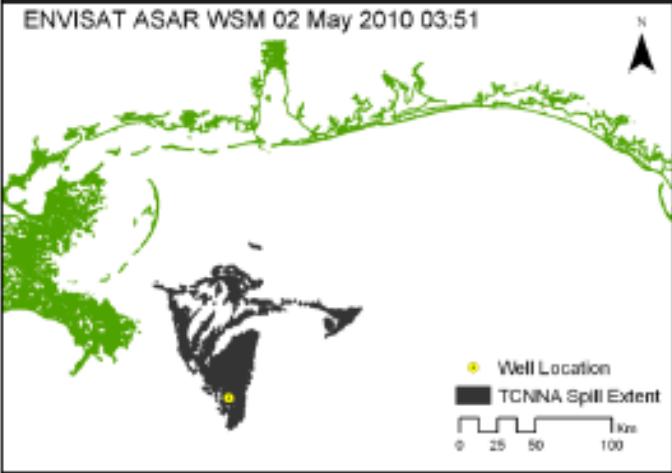
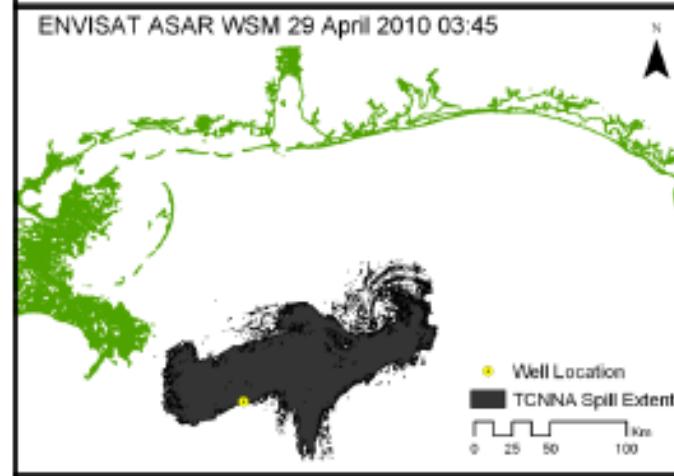
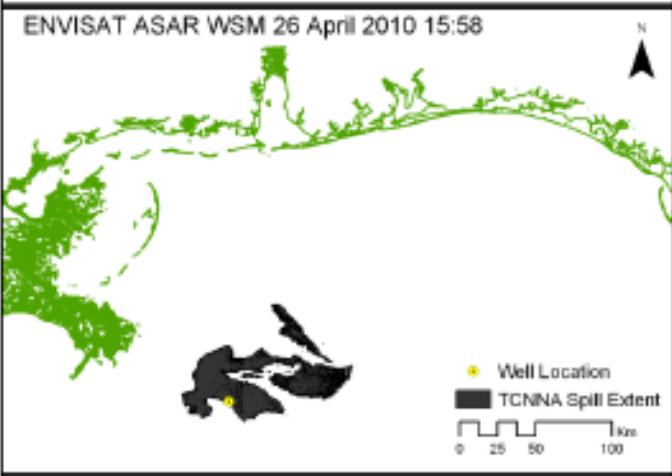
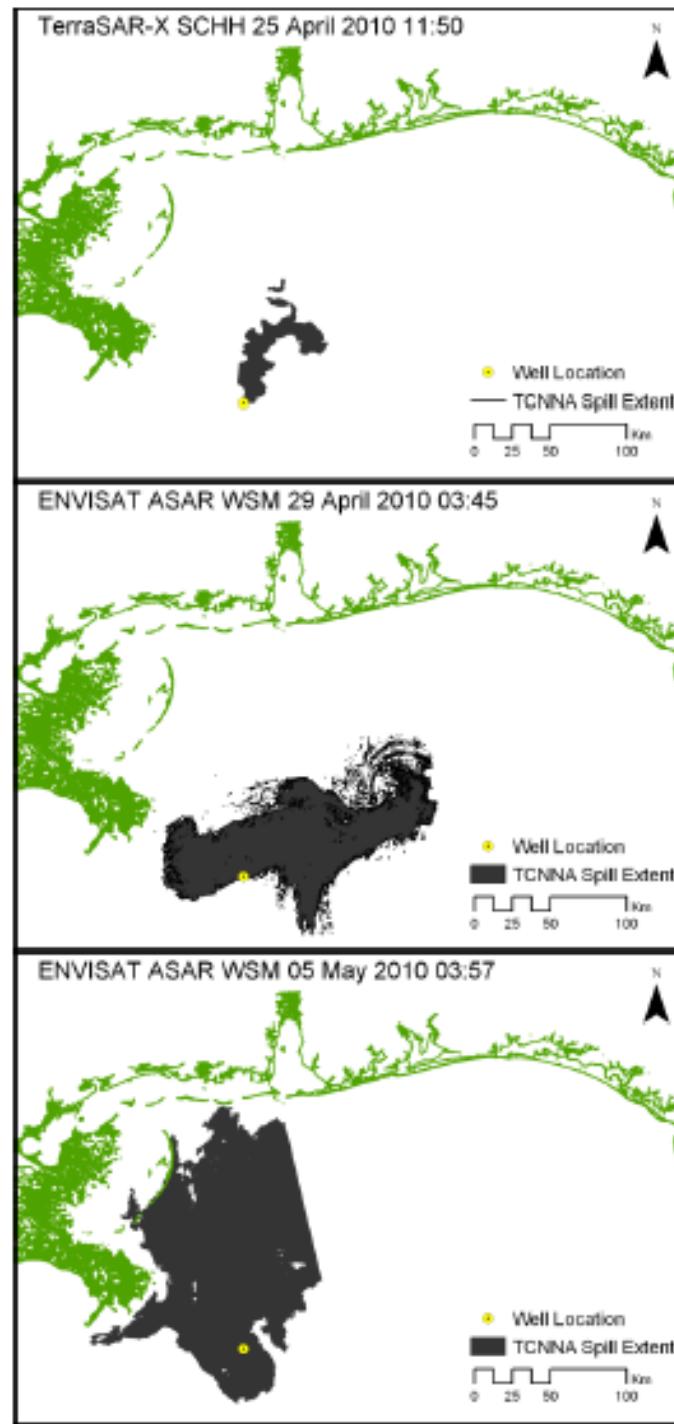
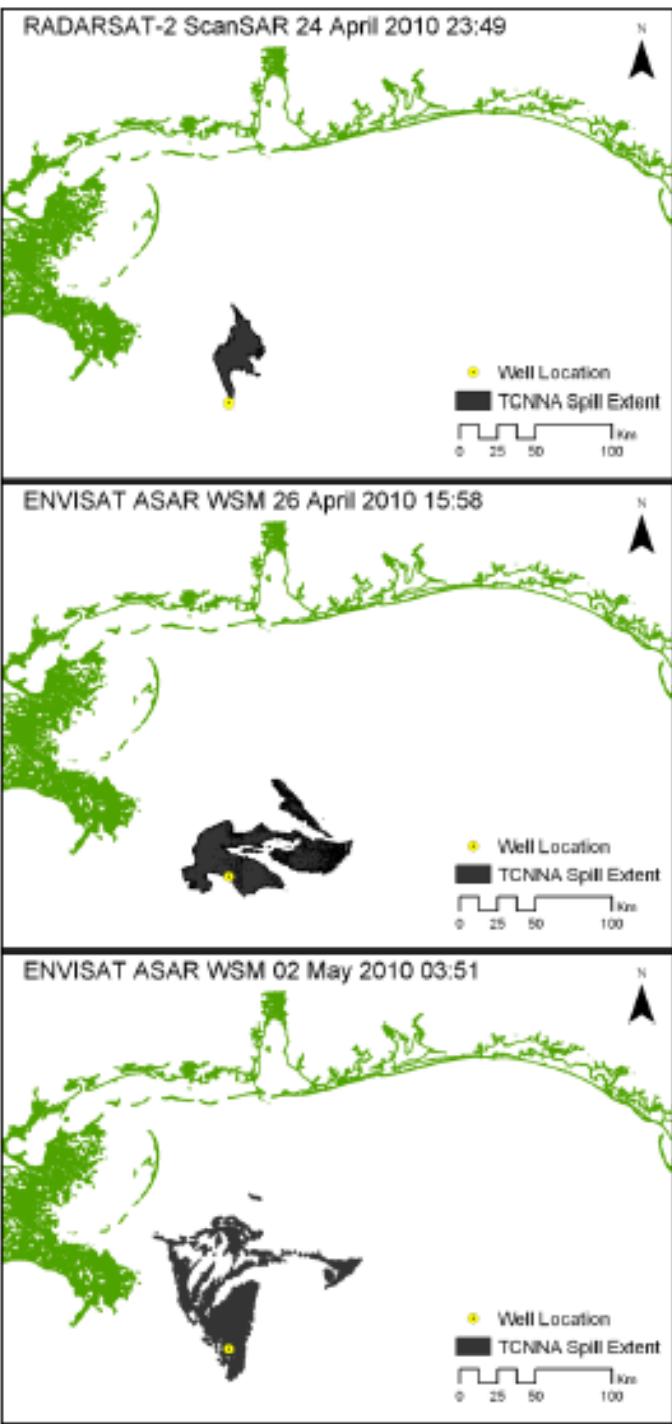
TCNNA Output on May 2, 2010 ENVISAT SAR
2274 Km² were detected as surface waters containing oil.

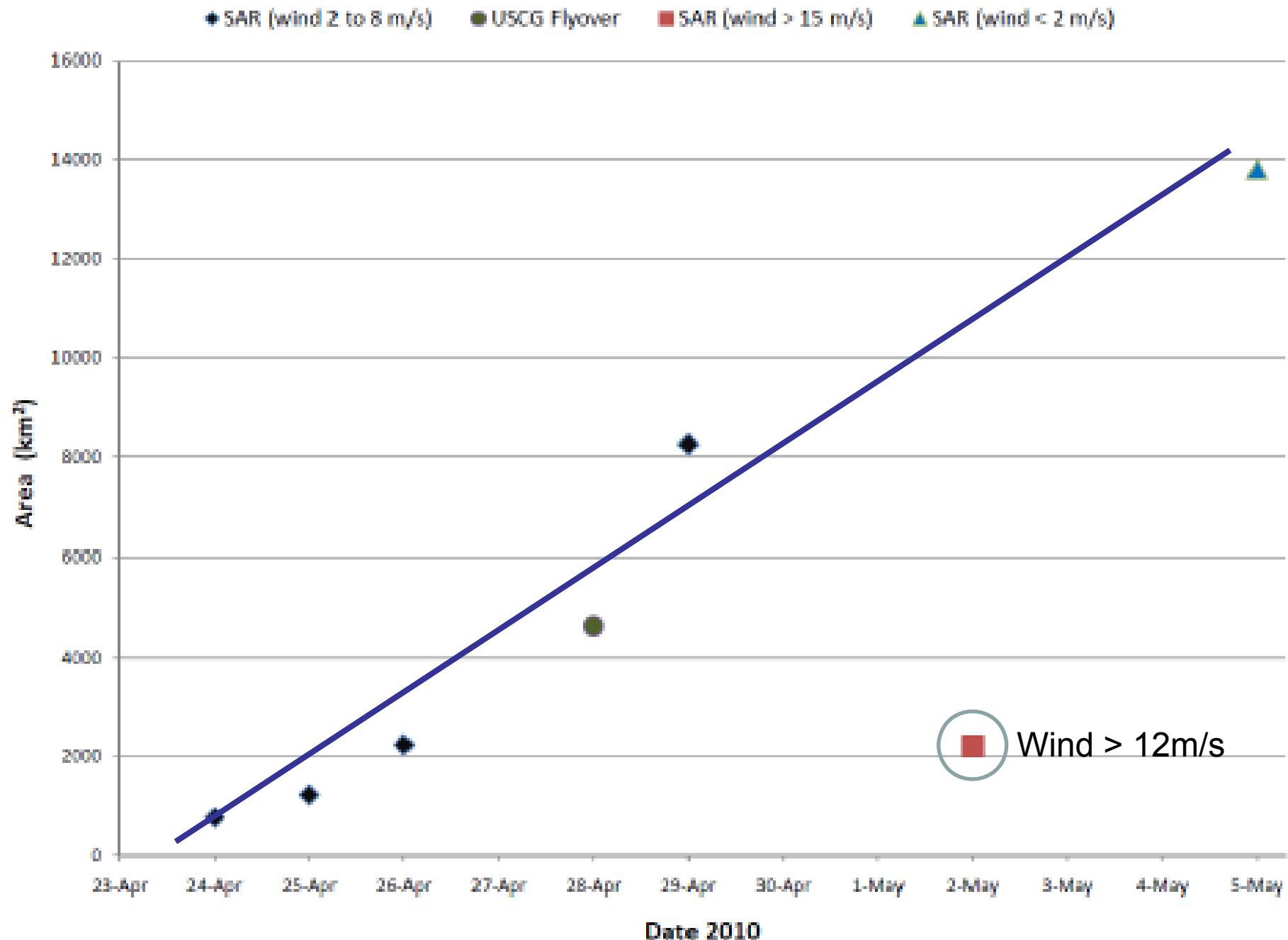
Strong winds indicates that this area contains very heavy hydrocarbons that still damps capillary waves. It is possible to infer that a larger area contains oil that is not detected due the high winds



TCNNA Analysis GOM Oil Spill. Envisat May 5







- A human hair is approximately 100 µm.
 - The main slick, which corresponds to the cross-hatched area was assigned a low value of 0.5 µm.
 - Considering that the oil then in the water had been deposited since 21 April, the flow rate would have been on the order of **25,000** bbl per day.
 - Some fraction of the total oil released will have been evaporated or emulsified and sunk in the time since the spill began.
- Exxon Valdez spill = 261,000 bbl
- Today is May19, So far Deep Horizon spill
 $= 28(\text{days}) \times 25000(\text{bbl}) = 700,000 \text{ bbl}$

 Symbols
Oil Slick

Analysis
TCNNA Output on
Due to the strong current,
has reached its record
The red slick shows
side of the large cold
further into the Loop Current.

Oil Spill Academic Task Force (OSATF) - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Oil Spill Academic Task Force (OSATF)

FAU
FIU
UF
JU
LMU
NOVA
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Oil Spill Academic Task Force

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OSATF Expert Finder Portal
to find scientists and scholars
in a particular area of expertise

Scientific Concerns
Concerns regarding
mid-water transport of oil
from well

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- Florida State University**
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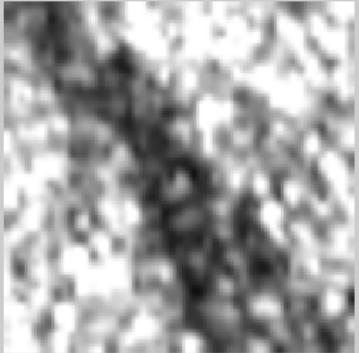


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Pixel ID=59
Pixel Value =141



Neighborhood Texture
Target=1

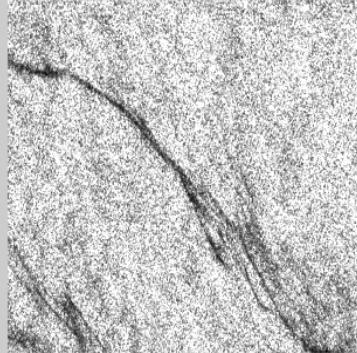
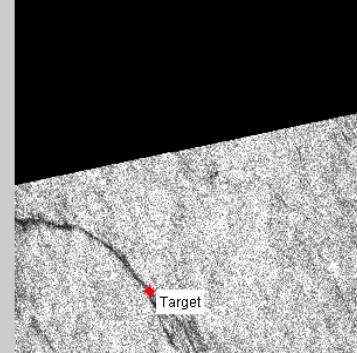


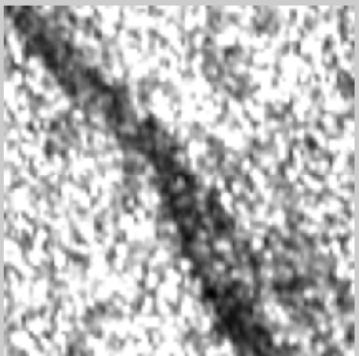
Image #1



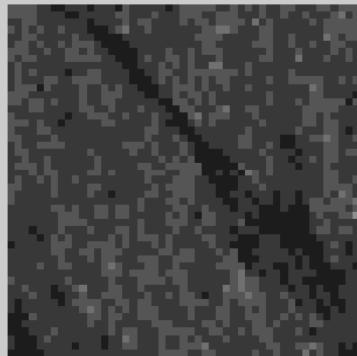
Incidence Angle
=25



Normalized Radar Cross Section
25 x 25 Neighborhood



CMOD5 wind output
Averaged Wind 1km²



Wind CMOD5
Output =4m/s



Ocean Surface NRCS
CMOD5 + Texture Descriptors

