SLOSH Display Program (SDP) 101

Storm Surge Workshop
Mobile - May 26, 2011

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NOAA - NWS - OST - MDL
SLOSH Display Program (SDP)

• What is the SDP?
  – A GIS provided by NOAA to display storm surge output and related information such as tides and observations

• What should it be used for?
  – Examine MOMs and MEOWs
  – Look at vulnerability of critical locations/sites
  – Animate real-time and historic Rex Files
  – Convince management that there’s a problem
How to get the SDP

• URL for downloading the SDP
  – http://slosh.nws.noaa.gov/sloshPriv/
    • Username = Gustav2008, Password = Ike2008

• More information on the SLOSH model
  – http://slosh.nws.noaa.gov/sloshPub/
http://slosh.nws.noaa.gov/sloshPriv

user = Gustav2008, pass = Ike2008
SLOSH Display Package: Registration

Do you want us to alert you to bug fixes, new release, and interesting SLOSH related events?
You can download the program without registering. If you are trying to decide whether to register, past release notes can be seen here: Release Notes

1. Yes
2. No

If so, please provide your email address:

Submit

Next: Download Page
http://slosh.nws.noaa.gov/sloshPriv/download.php

SLOSH Display Package: Download

Please remember to Register

SLOSH Package. This consists of everything needed to run the program. (Data downloaded separately):

  (md5sum=59e0054c1f724de0c9d49e1f0c83867)
  This install program has the option to create short cuts, so please run it with the appropriate permissions. Please verify that you get the full 67,388,162 bytes.

  (md5sum=81b6c5d634b2142b6c7155d37a59)
  Expand with tar -xvf sloshdp-all.tar.gz.
  Run with cd sloshdp. sloshdp.sh
  Please verify that you get the full 88,013,728 bytes.

Click here for MEOW/MOM data sets
Click here for MOM files in .shp file format
Click here for MEOW files in .shp file format
Click here for Rexfile data sets
Click here for rexout-1.30-20090820.tar.gz (Version 1.3: 1,598,929 bytes: 8/20/2009)
(md5sum=499cc04fb914d956a16b8c6b63b3bab29) rexout program to probe rexfiles at given points.
SLOSH Display Package: Rexfile Download

Please note that you can automatically download the historical Rex files using the SLOSH Display Program. "menu Download->Download Rexfiles"

To manually download a Rexfile, click on the desired file below, and (assuming a default installation) store it in c:slosh.pkg\slosh\dsprexfiles\download. Then go to "Animate->Animate rex file" and click on "Update list of Animations".

<table>
<thead>
<tr>
<th>#</th>
<th>Rexfile Name</th>
<th>As of Date</th>
<th>Size</th>
<th>MD5Sum</th>
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</table>
Get Data (MEOW/MOM)
Get Data (MEOW/MOM)
Get Data (Rex File)
Get Data (Rex File)
MEOW / MOM Module

• P-Surge
  – Probabilistic Storm Surge

• MEOW
  – Maximum Envelope Of Water

• MOM
  – Maximum Of the MEOWs
Select Basin
Select Basin
Select Storm (MEOW)
Select Storm (MEOW) Direction: N, Category: 3, Speed: 25 MPH (Mean)
Select Storm (MEOW)
Select Storm (MOM)

MOMs for Each Category at Mean Tide

MOMs for Each Category at High Tide

C3_MEAN.MS6
TIDE LEVEL = MEAN

C3_HIGH.MS6
TIDE LEVEL = HIGH

Category 3
Select Storm (MOM)
Select Storm (MEOW)
Select Storm (MEOW)
Move Labels
Zoom In
Probe Points
Probe Points
Probe Points
Subtract Land
Subtract Land
Subtract Land (New Orleans)
Subtract Land (New Orleans)
Inquire All
Inquire All

Recent Fixes:
- Double click select
- Abv Grid Cell label

N=North, 25=Fwd Speed
I0=Mean Tide or 0 foot Initial Height
While thinking about animation files and walking my dog Rex in ‘97, I asked: If it's raining “Cats and Dogs”, we've got Cats, where are the Dogs?

Thus was created the “Rex File”
Animate a Rex File
Animate a Rex File
Animate a Rex File
Animate a Rex File
Time History Point
Can show SLOSH’s interpretation of the Timing of wind vs surge
Wind Barbs
Wind Barbs
Wind Barbs
Pressure Contours
Entire Grid
Entire Grid
Ensemble Products

- **P-Surge**
  - Probabilistic Storm Surge

- **MEOW**
  - Maximum Envelope Of Water

- **MOM**
  - Maximum Of the MEOWs
Hurricane Ivan: A case study

Surges based on NHC Advisory 54 for Ivan

Surges based on NHC best track for Ivan
P-surge - Vary Cross Track
But wait, I have more dogs
(all adopted from shelters)

Adventure:
Small, Intense, Slower

Buddy:
Large, Laid Back, Medium speed

Sandy:
Medium Size, Medium Intensity, Fast
P-Surge – Vary Other Variables

- Size: Small (30%), Medium (40%), Large (30%)
- Forward Speed: Fast (30%), Medium (40%), Slow (30%)
- Intensity: Strong (30%), Medium (40%), Weak (30%)
P-surge Error Distributions

- Error distributions are computed for cross track, along track and intensity by:
  - Assuming a normal distribution
  - Using a 5-year “mean absolute error” and getting the standard deviation (sigma) from:
Probability of >= 5 feet of Surge

http://www.weather.gov/mdl/psurge/
Surge Height Exceeded by 10% of Ensemble Members

http://www.weather.gov/mdl/psurge/

Experimental Tropical Cyclone Storm Surge Exceedance
Heights Which Have a 10% Chance of Being Exceeded
Hurricane Ivan (2004) Advisory 54
Valid from 05 PM EDT Wed Sep 15 to 10 PM EDT Sat Sep 18
Observation & Tide Module

- Mix Surge model output
- with Tide predictions
- and compare to Observations
Observational Enhancements to SDP

Observed water level, winds, and computed residual displayed on the map at each station.

Graphs for NOS/NDBC stations depict observed water level and winds, various datums, predicted tide and surge, calculated residual, and storm tide.
Observed water level, winds, and computed residual displayed on the map
Tide Program
Tide Program
What’s Left?

Kitchen sink
Save to KML, Shp, MIF, PCX, TIF, GIF and Printing
Annotation
Toggle Grid off
Toggle Tracks off
Toggle Rivers on
Change County Border Color
Color Scale
User Provided Shp files

- Place your own data in "c:/slosh.pkg/sloshdsp/shpfiles"
Backup
Storm Surge Cheat Sheet

• Highest surges usually occur to the right of the storm track
• Fast moving = high surges along the open coast
• Slow moving = greater flooding inside bays and estuaries
• Direction of storm approach often impacts the extent of flooding

• More intense storms cause higher surges
• Larger storms affect longer stretches of coastline

• Shallow coastal slopes allow greater storm surge with small waves
• Steeper coastal slopes cause less storm surge, but larger breaking waves can occur.
Bonus: SLOSH Track Program
Bonus: SLOSH Track Program
http://www.weather.gov/mdl/etsurge/index.php?page=map&region=me