Real-time Generation of River Ice and Flood Products Derived from VIIRS Imagery

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Overview

- Two products
  - River flood from GMU
  - River ice from CCNY

- Realtime processing
  - SSEC/CIMSS
  - Geographic Information Network of Alaska (GINA)

- Product distribution
  - AWIPS II for use and evaluation by National Weather Service
  - RealEarth (Web Map Service at CIMSS) for general access

- Status and future plans
River Flood Product

- Estimate of flooding water fraction

- Regions of ice, cloud, snow cover, and cloud shadow identified

- Algorithm developed at George Mason University (GMU)
  - VIIRS: SVI01, 2, 3, 5, Cloud mask (IICMO)
  - Ancillary: Global land cover, DEM, land/sea mask, MODIS water mask, land/sea surface temperature
  - C/C++ and IDL
River Flood Product

- Output: HDF and PNG files, by granule
- Contact: Sanmei Li

Reference:
River Ice Product

- Information on river ice location, extent, and concentration

- Algorithm developed at City College of New York (CCNY)
  - VIIRS: SVI01, 2, 3, 5, Cloud mask (IICMO)
  - Ancillary: CCNY provides Matlab files of specific rivers
  - Matlab
River Ice Product

- Output: HDF and PNG files, by granule
- Contact: Naira Chaouch

Reference:
CIMSS Role

- Produce the products in near real-time
  - Use CSPP-generated VIIRS SDRs and EDRs from SSEC and GINA DB data
  - Work with algorithm providers (GMU and CCNY) to run their research code in our environment

- Reformat products
  - Convert and concatenate PNG files to:
    - AWIPS II compatible netCDF files
    - GeoTIFF for use in SSEC’s RealEarth Web Map Service (WMS)
      - RealEarth WMS available as part of IMAPP
CIMSS Role

- Distribute products for evaluation to:
  - NWS River Forecast Centers (RFC) via the Unidata Local Data Manager (LDM) to their AWIPS II
  - RealEarth for everyone

- Update algorithms
  - Based on user feedback
  - Bug fixes
  - General improvements
    - Performance, etc.
RealEarth

- http://realearth.ssec.wisc.edu/
- Web Map Service (WMS) hosted at SSEC
- Provides overlays, transparencies, color enhancements
- Right click to probe and get data value
- Left and right arrow keys to step through different times
- ‘Share’ button in the Display Controls
  - Options to share display: web link, KML (Google Earth), Facebook, Twitter
  - Save as GeoTIFF
- 200+ real-time satellite, radar, METAR, snow depth, etc.
  - River Ice and Flood products are in the ‘Hazards’ category
Products Legend (RealEarth)

- River Flood
  - MS: Missing
  - LD: Land
  - SN: Snow
  - IC: Ice
  - CL: Cloud
  - CS: Cloud Shadow
  - WA: Water
  - 0 – 90: Water fraction

- River Ice:
NCRFC: River Flood
NCRFC: River Ice
River Ice (Data Probe)
Regional coverage

Missouri Basin

North East

West Gulf

Alaska Pacific
River Flood with Landsat
River Flood with Landsat
Product Status

- River Flood: All sectors generated routinely
- River Ice: All sectors generated routinely
- Products updated about twice daily for each RFC region
- Polar orbit tracks

http://www.ssec.wisc.edu/datacenter/npp/NA.html
http://www.ssec.wisc.edu/datacenter/npp/ARCTIC.html
River Flood in RealEarth

- NCRFC, NERFC, MBRFC, WGRFC, APRFC regions
- These links will always display the last 2 days
  - North Central: http://realearth.ssec.wisc.edu/s/S1ZuU
  - North East: http://realearth.ssec.wisc.edu/s/E1ZxU
  - Missouri Basin: http://realearth.ssec.wisc.edu/s/f1Zys
  - West Gulf: http://realearth.ssec.wisc.edu/s/y1ZBB
  - Alaska Pacific: http://realearth.ssec.wisc.edu/s/01ZCM
River Ice in RealEarth

- NCRFC, NERFC, MBRFC, APRFC regions (no WGRFC)
- These links will always display the last 2 days
  - North Central:  http://realearth.ssec.wisc.edu/s/e2eZW
  - North East:     http://realearth.ssec.wisc.edu/s/v2f1P
  - Missouri Basin: http://realearth.ssec.wisc.edu/s/A277j
  - Alaska Pacific: http://realearth.ssec.wisc.edu/s/j274a
River Flood Product: Bangladesh

Changes in flooding over the summer of 2014 in Bangladesh

“An official at the disaster management...said the floods have affected more than 74,000 people...and have also affected crops, with more than 100,000 acres of farmland submerged in 20 districts, most in the north of the country.” (Reuters, 26 Aug 2014)
Mobile access to RealEarth: Browser

- Start with shortcut link
- No data probes

http://realearth.ssec.wisc.edu/s/S1ZuU
Mobile access to RealEarth: Native app

- **WxSat on iOS and Android**

Currently only global composites of visible, IR window, and water vapor channels
Update to WxSat App

- Access to all 200+ RealEarth products
- Create favorites
- Likely to be called ‘RealEarth’
- Available later this year
Status and Future Plans

- Product generation continues at CIMSS and GINA
- Proposal to NOAA to incorporate the river ice and flood algorithms into the CSPP
- Update to WxSat app to access all RealEarth products