

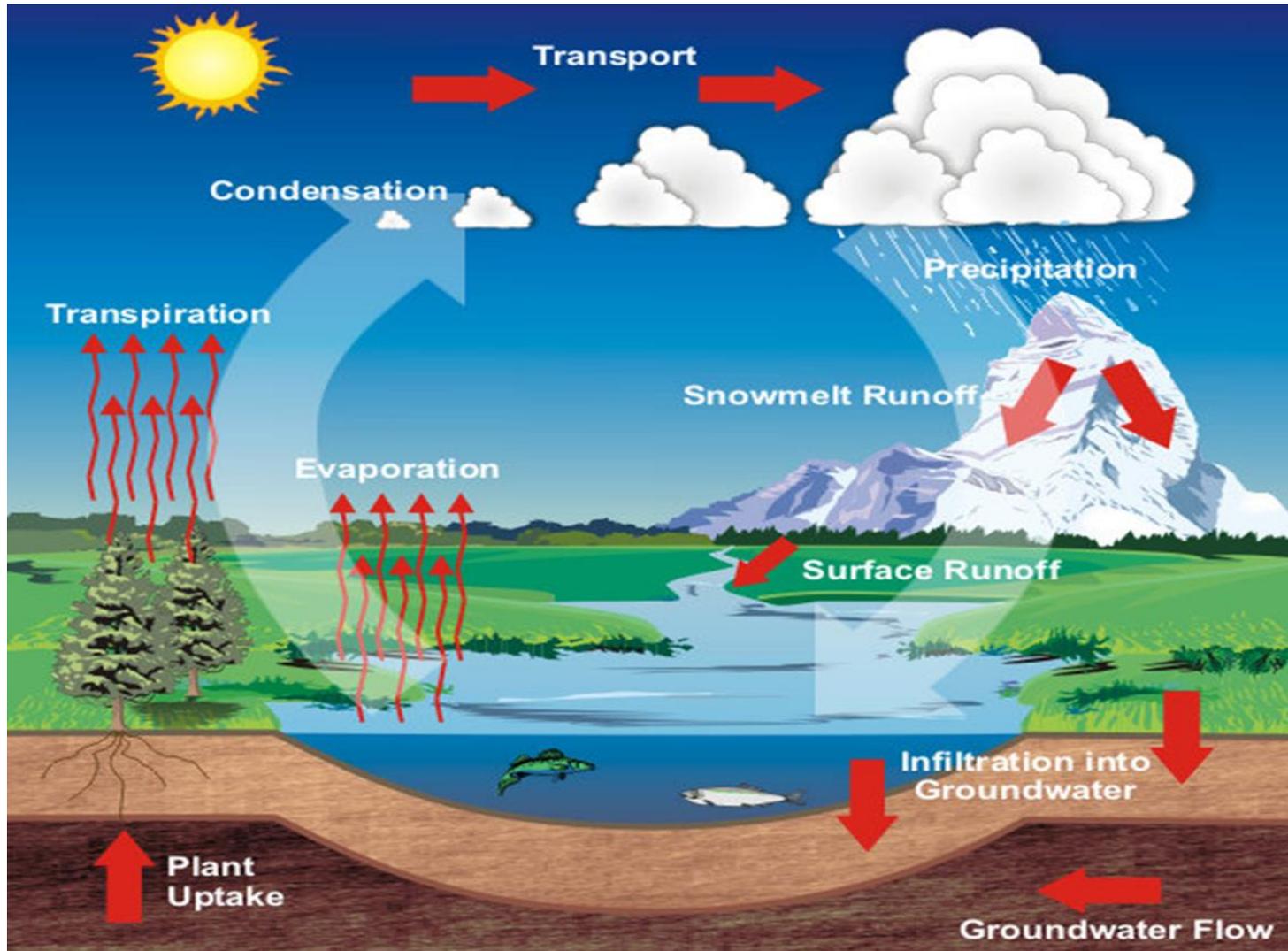


HYDROLOGY PRODUCTS OVERVIEW

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- Why we want to monitor it
- What do we consider as “Hydrology” Products?
 - Operational products
 - JPSS Baseline
 - Legacy POES baseline
 - Blended products (fall under both categories)
 - Emerging JPSS PGRR Products
- What we will hear in this session

The Hydrological Cycle – Very Diverse!



Why We Need to Monitor and Understand it

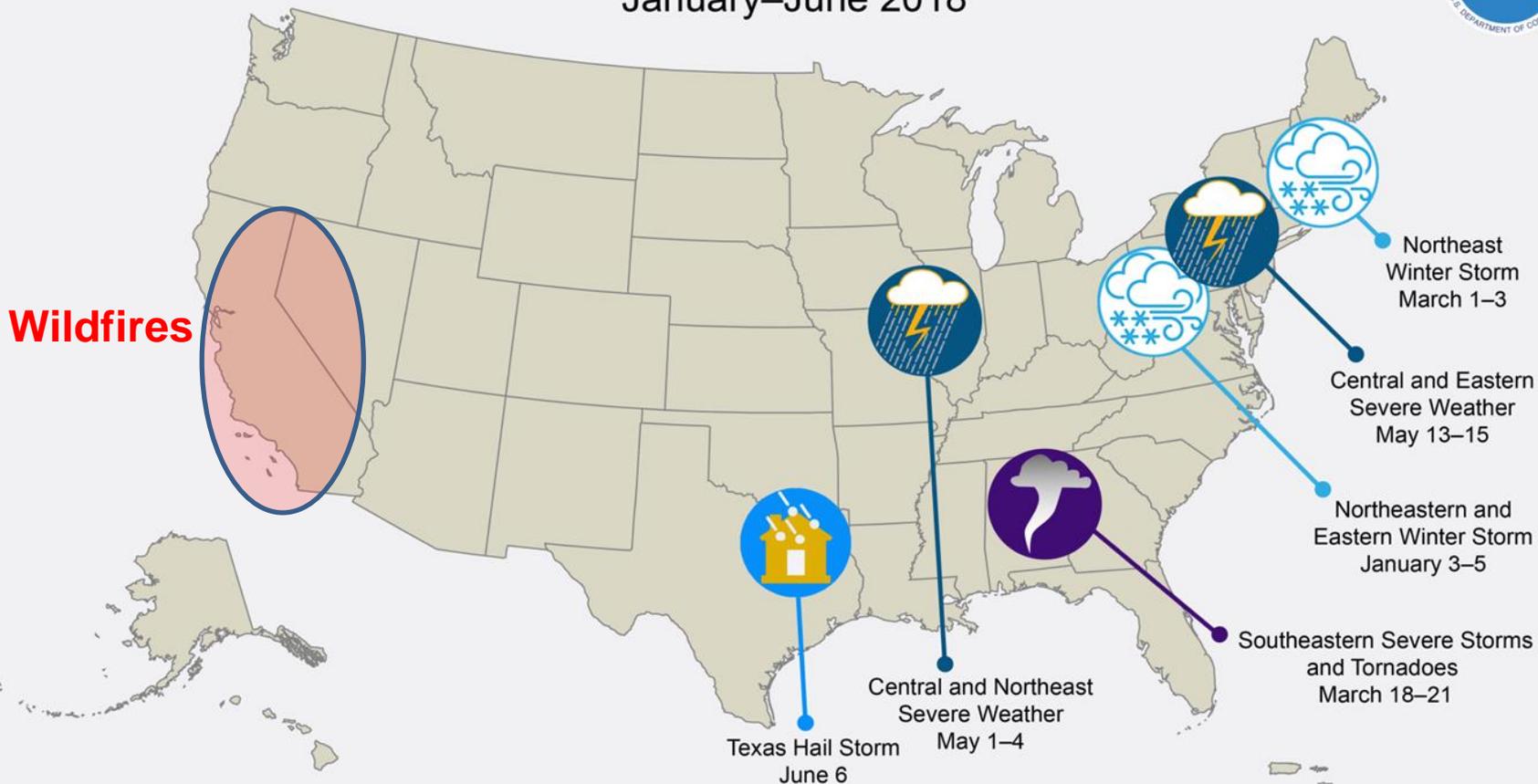
U.S. 2017 Billion-Dollar Weather and Climate Disasters



This map denotes the approximate location for each of the 16 billion-dollar weather and climate disasters that impacted the United States during 2017.

Why We Need to Monitor and Understand it

U.S. 2018 Billion-Dollar Weather and Climate Disasters January–June 2018



This map denotes the approximate location for each of the 6 separate billion-dollar weather and climate disasters that impacted the United States from Jan–Jun 2018.

- JPSS Baseline products/systems
 - Primarily from ATMS, AMSR-2, VIIRS
- JPSS/Legacy POES “blended” products
 - Primarily MW driven, includes AMSU/MHS and non-NOAA satellites like GPM and DMSP
- JPSS Proving Ground Risk Reduction (PGRR) developmental products
 - Enhancements to baseline, could include data fusion with GOES and in-situ
 - Newer, pushing limits of sensor capabilities
- **NOTE – Many of the products are microwave sensor driven**

- Microwave Integrated Retrieval System (MiRS)
 - <http://www.ospo.noaa.gov/Products/atmosphere/mirs/index.html>
- Microwave Snowfall Rate (SFR)
 - <http://www.ospo.noaa.gov/Products/atmosphere/mirs/index.html>
 - Also available on AWIPS
- NOAA Operational GCOM-W1 AMSR2 Products System (NOGAPS)
 - <http://www.ospo.noaa.gov/Products/atmosphere/gpds/>
- NESDIS Operational Soil Moisture Products (SMOPS)
 - <http://www.ospo.noaa.gov/Products/land/smops/index.html>
- Blended TPW/RR
 - <http://www.ospo.noaa.gov/Products/atmosphere/brr/>
- VIIRS snow and ice products
 - https://www.star.nesdis.noaa.gov/jpss/EDRs/products_cryosphere.php
 - http://hippy.gina.alaska.edu/distro/ice_eval/
 - http://hippy.gina.alaska.edu/distro/ice_motion_eval/
- Interactive MultiSensor Snow & Ice Mapping System (IMS)
 - <http://www.natice.noaa.gov/ims/index.html>

Some Uses of the Products....

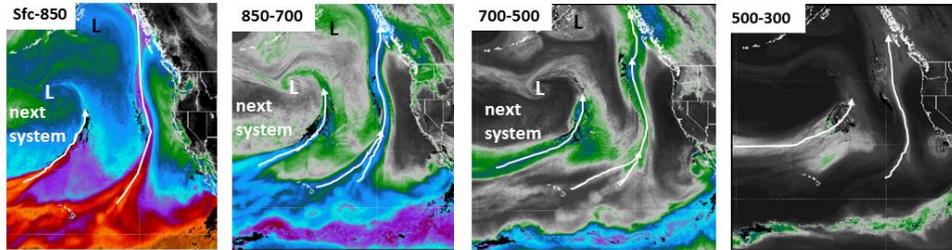
SNOWFALL RATES FROM SATELLITE DATA HELP WEATHER FORECASTERS

By Ralph Ferraro, Huan Meng, Brad Zavadsky, Sheldon Kusselson, Deidre Kann, Brian Gujer, Aaron Jacobs, Sarah Perfetter, Michael Folmer, Jun Dong, Cezar Kongoli, Banghua Yan, Nai-Yu Wang, and Limin Zhao

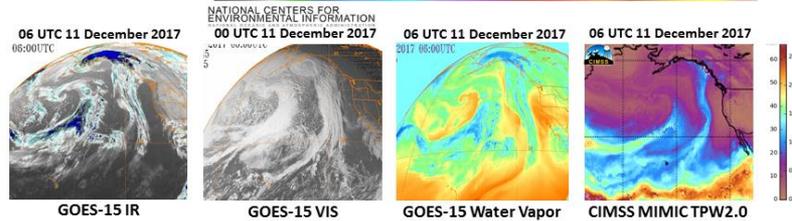
A new data product calculates snowfall rates from weather data beamed directly from several satellites, helping meteorologists provide fast, accurate weather reports and forecasts.

"Atmospheric Rivers" of High Concentrated Moisture into Alaska at 4 layers For a Week of Excessive Rainfall – Juneau, AK 11 & 13-14 December 2017

CIRA/Colorado State University Advected Layered Precipitable Water (ALPW) for 06 UTC 11 December 2017



Juneau*/Sitka, AK
Precipitation
11 December 2017
1.69"/1.26"
*Record Precip

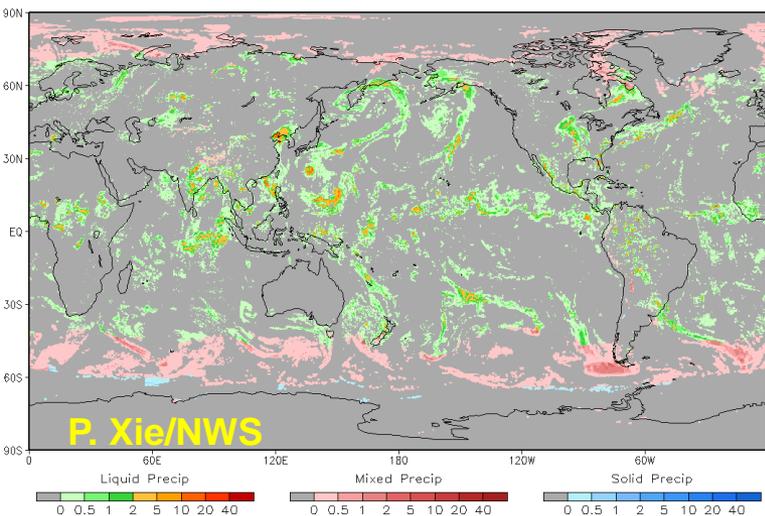


(Photo by Rashah McChesney/Alaska's Energy Desk)
<https://www.ktoo.org/2017/12/11/south-east-alaska-sees-warm-temps-lots-rain/>

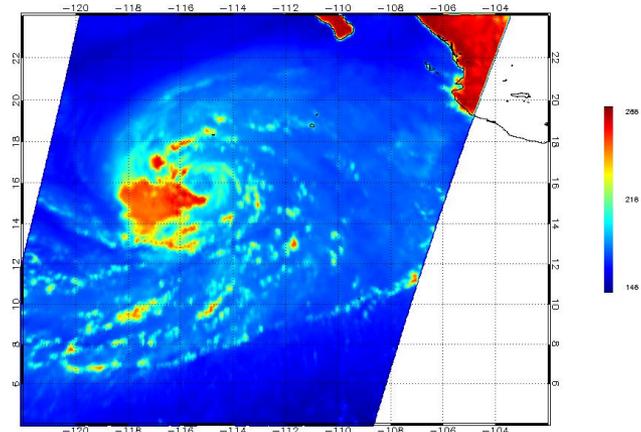
Analysis Prepared by
Sheldon Kusselson

ftp://ftp.cira.colostate.edu/ftp/Forsythe/LPW/Anim_GIF/2017Dec1121Advect_LPW_ALT_anim.gif

CMORPH2 Precip Rate @ 2018.08.20 00:00Z (mm/hr)



AMSR-2 36.5GHz H-pol Date: 20180629-1218Z
Storm Name: EMILIA Region: Eastern_Pacific
AMSR2 L1B file: CH1AM2_201806290855_035B_L1SNBTBR_2220220.h5



JPSS PGRR Hydrology Initiative Projects/Participants FY15-FY17 (a few go into FY18)

Project PI	Project Title
Dave Gochis (NCAR)	Applying Snow Products from S-NPP JPSS and SNODAS to Seasonal Streamflow Forecasting at the NWS National Water Center
Huan Meng (NESDIS/STAR)	Continued expansion, enhancement and evolution of the NESDIS snowfall rate product to support weather forecasting
Pingping Xie (NWS/NCEP)	Reprocessing of JPSS precipitation and OLR products for improved operational climate applications
John Forsythe (CSU/CIRA)	Using JPSS Retrievals to Implement a Multisensor, Synoptic, Layered Water Vapor Product for Forecasters
Tony Wimmers (UW/CIMSS)	Strengthening TPW visualization in the OCONUS domain with JPSS data products
Tarendra Lakhankar (CUNY/CREST)	Validation and Application of JPSS/GCOM-W Soil Moisture Data Product for operational flood monitoring in Puerto Rico
Andi Walther (UM/CIMSS)	Further development of the VIIRS Nighttime Lunar Reflectance-derived Cloud Properties and the Demonstration for their use for Precipitation and Icing Applications

FY18 New Hydrology Project Selections

Project PI	Project Title
Huan Meng (NESDIS/STAR)	Development of Snowfall Rate over Ocean, Sea Ice, and Coast Product to Support Weather Forecasting
Pingping Xie (NWS/NCEP)	Improving and Reprocessing the CMORPH Satellite Precipitation Estimates and Global OLR Analysis with Retrievals from JPSS
John Forsythe (CSU/CIRA) and Tony Wimmers (UW/CIMSS)	Merged Water Vapor Products for Forecasters using Advanced Visualization Methods
Tarendra Lakhankar (CUNY/CREST)	Ensemble flood forecasting system coupling WRF-Hydro with Satellite Data (JPSS and GOES-R) for Puerto Rico
Xiwu Zhan (NESDIS/STAR) and Nai-Yu Wang (UMD/CICS)	Improving JPSS Soil Moisture Data Products for Use in Evaluation and Benchmarking of the National Water Model

- Moved the SFR product from a research product to a JPSS requirement
 - Allows for base funding to sustain the product for future sensors, perform routine validation, etc.
- Plans in place to get the LTPW into operational phase
- Matured engagement with NWS end users on several products
 - SFR – NWSFO product evaluations, use in WPC Winter Experiment
 - Layered and MIMIC TPW
 - National Water Center/National Water Model
- Developing synergies with River Flood/Ice and NUCAPS initiatives
- Expanded working group to include JPSS and GOES-R baseline projects
 - An outcome - enhancing bTPW product via L2 MiRS and GCOM TPW improvements
- Examining case studies of extreme events/product performance
 - CA Atmospheric Rivers past few winters
 - Hurricane rainfall, most recently, Harvey

The Remainder of the Session

Auditorium: Hydrology EDRs and Initiative - Trends and Drivers - Imagery EDRs and Visualization - Wrapup

Time	Presentations / Topics	Speaker	Affiliation
0830 - 0900	<i>Keynote Talk: Updates on CEOS/CGMS climate working group and how operational satellite programs can contribute to long term climate records</i>	Jörg Schulz	EUMETSAT
0900 - 1030	Hydrology EDRs and Initiatives (GCOM-W included) Chairs: Ralph Ferraro and Huan Meng Auditorium		
0900 - 0915	<i>Hydrology Products Overview - Operational and PGRR products and projects</i>	Ralph Ferraro	STAR
0915 - 0930	<i>MiRS Hydrological Products</i>	Chris Grassotti	CICS-MD
0930 - 0945	<i>Microwave Snowfall Rates</i>	Huan Meng	STAR
0945 - 1000	<i>GCOM Hydrological Products</i>	Paul Chang	STAR
1000 - 1015	<i>SMOPS Soil Moisture Products</i>	Jerry Zhan	STAR
1015 - 1030	<i>Satellite Hydrological Products Operational Applications in Alaska</i>	Jessica Cherry	NWS/APRFC
1030 - 1045	Break		