National Weather Service

Hydrology Programs

David Kitzmiller

Hydrologic Science and Modeling Branch

Office of Hydrologic Development

David.Kitzmiller@noaa..gov

Integrated Water Forecasting Program

NOAA's Role: Provide accurate and reliable water forecasts (*where, when, and how much*)

Seamless Suite: Summit-to-Sea, Floods-to-Droughts, Short-to-Long Term

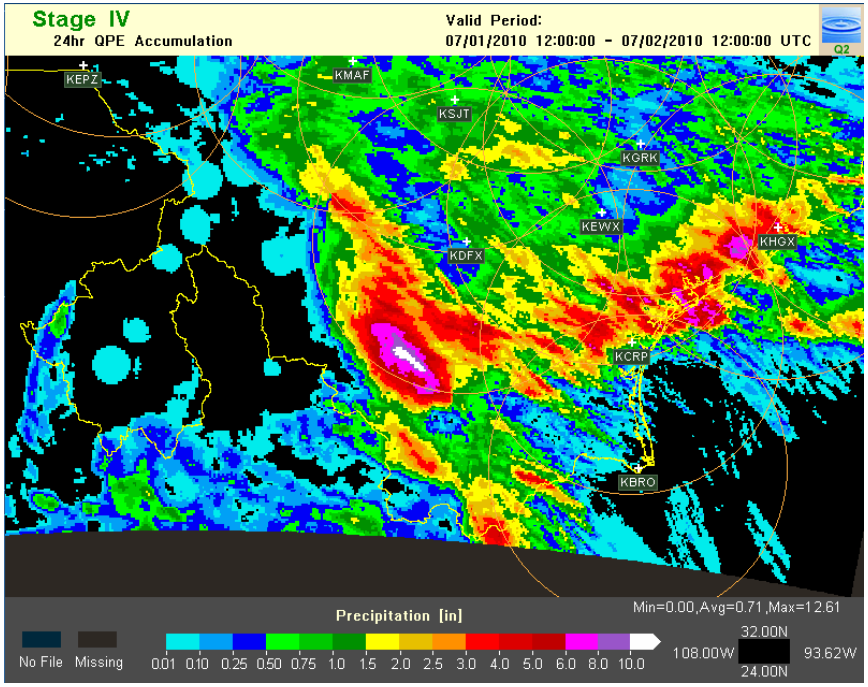
Rivers and Floods	Coasts, Lakes and Estuaries	Water Resources
Advanced Hydrologic Prediction Service (AHPS)	**Coast, Estuary, River Information Services (CERIS)**	**Integrated Water Resources Science and Services (IWRSS)**

Community Hydrologic Prediction System (CHPS)

Reduce 1-7 day river forecast errors and quantify uncertainty	*Couple modeling systems for rivers, lakes and estuaries*	*Deliver seamless, high resolution water quantity and quality forecasts*
Provide flood inundation forecast maps for high-impact communities		*Advance and integrate observing systems*

NWS Hydrology

- River Forecast Centers perform crucial work in estimating precipitation:
  - Human quality control of all input
  - Integration of multiple sensor inputs
- High-resolution precipitation estimate grids used in:
  - River Forecasts
  - Flash Flood Guidance
  - Forecast verification



NWS Office of Hydrologic Development (OHD)

- OHD provides:
  - science and software research, development and support
  - operational hydrologic data and information services
- Principal internal customers:
  - NWS River Forecast Centers and Weather Forecast Offices
- Software is delivered via:
  - Community Hydrologic Prediction System (CHPS)
  - AWIPS
  - Stand-alone software packages
- OHD leads the multi-agency development and implementation of Integrated Water Resources Science and Services (IWRSS)

NWS-OHD

Gaps in current satellite product suite

- **Spatial (coverage) gaps:** Alaska, North Mexico, Intermountain West
- **Temporal gaps:** Much of cool season over CONUS
  - IR-based techniques perform poorly
  - Snow detection and estimation via satellite is not mature
- **Latency gaps:** Microwave precipitation estimates have lags of multiple hours
- **Accuracy shortcomings:**
  - Limitations on IR satellite approaches in the warm season (blended IR/MWV performs better)
  - Snow detection
- **How GPM era products might help:**
  - Coverage for high latitudes
  - Improvement on IR-only algorithms
  - Reduction of time lag in product delivery

NWS-OHD
Potential Contributions to GPM Integration

- **Integration of new data sources through Multisensor Precipitation Estimator within Advanced Weather Interactive Processing System (AWIPS)**
- **Recently fielded capability for ingest and utilization of user-supplied input precipitation estimation grids**
  - **Numerical forecast model input**
  - **NMQ/Q2 (National Multisensor Quantitative Precipitation suite)**
  - **Now working on dual-polarization radar inputs**
- **Coordinate user training with Office of Climate Water and Weather Services**

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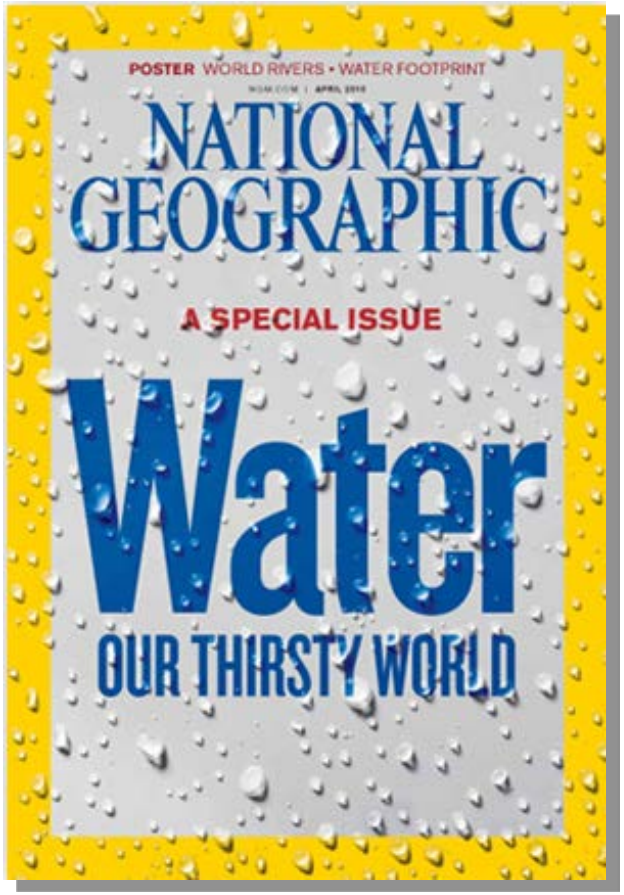
Questions?

The Global Water Imperative



Protect Life and Property	• Floods and droughts cause more U.S. economic losses than any other type of natural disaster
Support Economic Security	• Water has always been a critical component in the success of any economic endeavor
Protect Health and Environment	• Water is the lifeblood of this planet
Mitigate Escalating Risk	• Triple Threat: Scarcity and floods, climate change, and aging infrastructure

"Nearly half of the streams and lakes in the U.S. are not clean enough to sustain swimming and fishing and our infrastructure has been given a D grade"

Integrated Water Resources Science and Services

Leap Ahead

Implement information and tools for next-generation adaptive water-related planning, preparedness and response activities

National Water Resources Information System

Goals

3 **Provide New Summit-to-Sea High-resolution Water Resources Information and Forecasts**

2 **Increase Accuracy and Timeliness of Water Information**

1 **Integrate Information and Simplify Access**

NOAA USACE USGS

NWS-Office of Hydrologic Development
River Prediction/Water Resources

Observation Requirement	T/O	Geographic Coverage	Vertical Resolution		Horizontal Resolution		Measurement Accuracy		Measurement Precision		Sampling Interval		Data Latency	
Precipitation Accumulations	T	Hemispheric U.S.	NA		4	km	1	mm/h	1	mm/h	1	hr	15	m
	O	Hemispheric U.S.			0.5	km	0.25	mm/h	0.25	mm/h	1	min	1	m
Precipitation Type	T	Hemispheric U.S.	NA		4	km	1				1	hr	15	m
	O	Hemispheric U.S.			1	km					6	min	3	m
Precipitation Rates	T	Hemispheric U.S.	NA		1	km	1	mm/h	1	mm/h	6	min	1	m
	O	Hemispheric U.S.			0.5	km	0.25	mm/h	0.25	mm/h	1	min	1	m

NWS-OHD

Next Steps for GPM-era data & products

- What are funded activities within your program/project over the next five years?
  - Now completing NESDIS-funded investigation of IR/microwave (SCaMPR) precip estimate impact on hydrologic modeling
- What are your funding gaps & limitations?
  - Support for product validation and application development
  - Support for data dissemination, software updates
- What are your plans to work with other elements of NOAA?
  - Involvement through NOAA Precipitation Measuring Mission Steering Group
- What are your plans to work with NASA?
  - No direct interaction

WW-IWF Requirements - CORL

Observation Requirement	Program Acronym	Prty	T / O	Geographic Coverage	Vertical Resolution		Horizontal Resolution		Measurement Accuracy		Sampling Interval		Data Latency	
					V	U	V	U	V	U	V	U	V	U
Precipitation Amount														
Precipitation Amount	WW-IWF	1	T	Hemi US	na	na	1	km	1	mm	6	min	3	min
Precipitation Amount			O	Hemi US	0	na	0.5	km	0.25	mm	1	min	1	min
Precipitation Rate														
Precipitation Rate	WW-IWF	1	T	Hemi US	na	na	1	km	1	mm/hr	6	min	3	min
Precipitation Rate			O	Global	0	na	0.5	km	0.25	mm/hr	1	min	1	min
Precipitation Type														
Precipitation Type	WW-IWF	1	T	Hemi US	na	na	1	km	na	na	6	min	3	min
Precipitation Type			O	Global	na	na	0.5	km	na	na	1	min	1	min

Legend:

T = Threshold O = Objective

V = Value U = Unit

Provide new “summit-to-sea” high-resolution water resources information and forecasts.