



The diagram shows a polar projection of Earth with various satellite orbits. Labels include: GOES-11, GOES-14, GOES-15, GOES-13, GOES-12, Metop-A Meteor M-N1, NOAA-17 FY-3A, DMSP-F18, NOAA-16 DMSP-F16, DMSP-F17, FY-3B, NOAA-19, JASON-2, MTSAT-2, MTSAT-1R, COMS-1, FY-2C, FY-2E, FY-2D, Electro-L, Meteosat-7, Meteosat-8, and Meteosat-9. Lines connect the satellites to their respective orbital paths.

# Space-based Weather and Climate Extremes Monitoring (SWCEM) Demonstration Project (SEMDP) in East Asia Western Pacific

CGMS-46-WMO-WP-16

Presented to CGMS-46 Plenary session, agenda item C  
WMO Secretariat

**The Workshop on Operational Space-based Weather and Climate Extremes Monitoring (SWCEM) was held in Geneva, Switzerland on 15-17 February, 2017.**

**The Workshop provided for a dialogue amongst satellite operators, WMO Regional Climate Centres (RCCs), National Meteorological and Hydrological Services (NMHSs), and the science community to stimulate the utilization of space-based observation data and products for monitoring selected weather and climate extremes (heavy rainfall and drought in particular) on a routine basis (“in operations”), in response to current and future user requirements.**




## After the successful workshop, the WMO Secretariat submitted the following recommendations to the CGM-WMO Executive Committee:

- (a) Establish a demonstration project on space-based weather and climate extremes monitoring (SEMDP) and decide on priority WMO Region(s) starting in 2018 for a two year duration;**
- (b) Identify the deliverables of the demonstration project, concentrating on products at national and regional levels:**
  - i. Monitoring accumulated heavy precipitation and droughts;**
  - ii. Making best use of existing and newly developed satellite derived products and time series of measurements;**
  - iii. Making best use of products that combine satellite information with in situ and/or model reanalysis data;**
- (c) Assess the SEMDP products and other results, and recommend which should be transitioned from research to operations;**

- **NOAA/NESDIS to support** the Space-based Monitoring of Weather and Climate Extremes project by providing satellite observations of heavy precipitation events, and land surface parameters for monitoring droughts. The observations are required with a short latency of about one day. Furthermore the project requires the creation of climate reference data sets which will be used by the RCCs to classify observations as extreme event or not. (A45.05)
- **JAXA to support** the Space-based Monitoring of Weather and Climate Extremes project by providing a short term (from 5-day up to monthly) climate normal from GSMP data archives as a reference precipitation data set for the initial SEMDP areas, i.e. East Asia and Western Pacific regions. JAXA is also requested to set-up the on-line environment to provide GSMP data with short latency to be utilized in the SEMDP. (A45.06)
- **IPWG co-chairs and rapporteur to provide** guidance on the estimation of uncertainties and representativeness of the short-latency precipitation products related to the Space-based Monitoring of Weather and Climate Extremes project. (A45.07)
- **CEOS/CGMS Working Group on Climate to provide** feedback on the proposed definition for ICDR. (A45.08)

**The ad-hoc meeting for drafting the Space-based Weather and Climate Extremes Monitoring (SWCEM) Demonstration Project (SEMDP) Implementation Plan was held in Geneva, Switzerland on 25-29 September.**

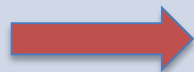
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- **The meeting focused on drafting an SEMDP Implementation Plan that will begin in 2018 with a duration of two years.**
  - **The pilot study will focus on WMO regions II and V (East Asia and Western Pacific regions) and will infuse satellite data sets into routine use by WMO Regional Climate Centers (RCCs), and develop a value-added products for distribution and use by WMO National Meteorological and Hydrological Services (NMHSs).**

## The SEMDP Workshop was held 19-22 March 2018 at Bagan Meteorologi, Klimatologi, dan Geofisika (BMKG) in Jakarta, Indonesia

- The workshop participants were asked to review and endorse the SEMDP Implementation Plan.
- It was recommended to organize the Steering Group for SEMDP (SG-SEMDP):
  - to plan the SEMDP products reviewing and validation workshop with training events to deliver recommended practices for the utilization of satellite products in conjunction with CLIMAT and SYNOP statistics for monitoring and reporting on extreme weather and climate events;
  - to establish the SEMDP “one-stop” web portal at WMO to provide access to satellite derived products for the use in monitoring extreme events by the WMO RCCs and NMHSs, and also to access to the results of validation by the WMO RCCs and NMHSs in the region.

# A45.05

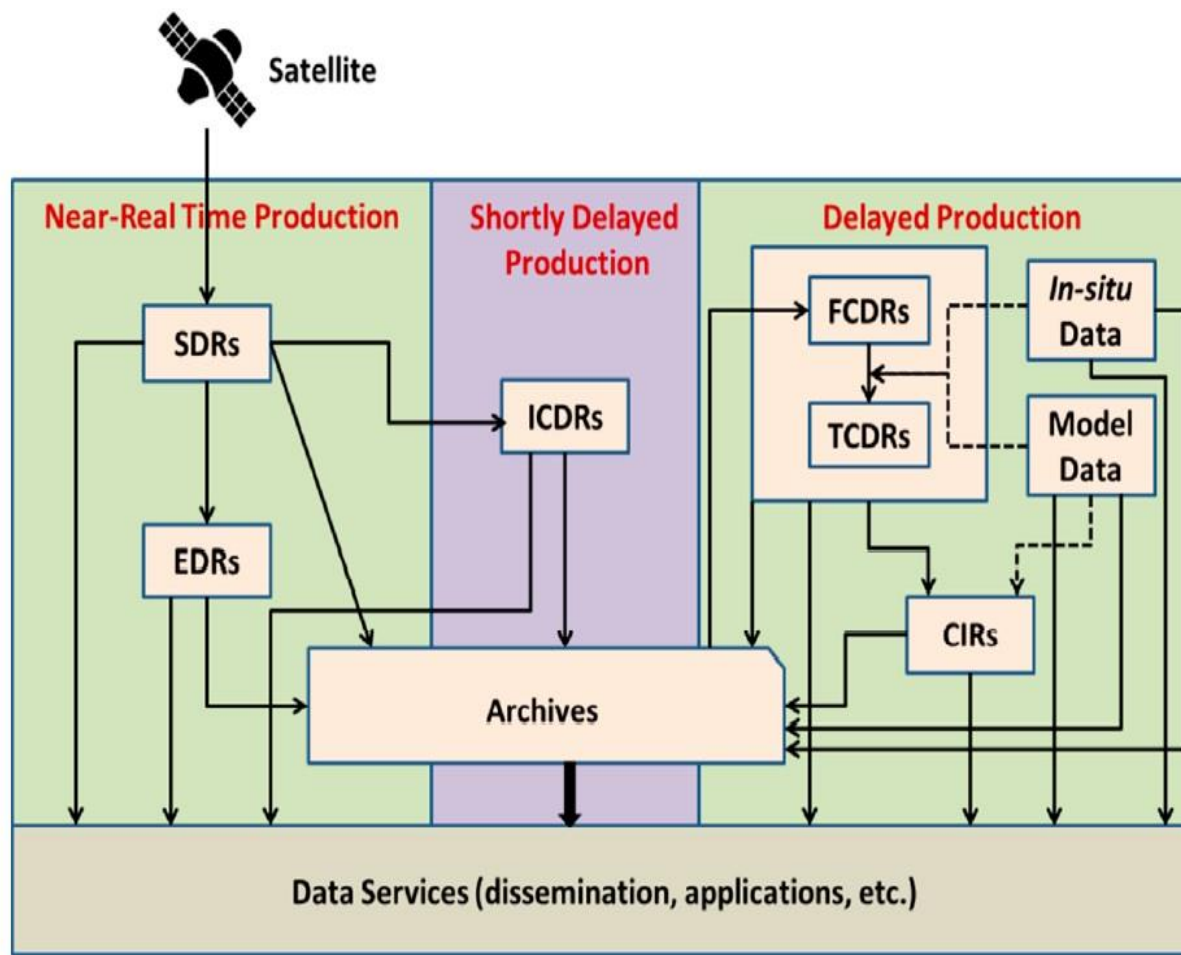
Product	Provider	Geophysical Parameter	Specification	Data Access/Documents
CMORPH	NOAA/N ESDIS NOAA/N WS/CPC	Precipitation (with rain gauge calibrated)	<p>Satellite(s): GPM-Core, GCOM-W1, NOAA series, MetOp series, TRMM, Aqua, DMSP series, five Geo-stationary meteorological satellites</p> <p>Spatial Coverage: Globe (60S-60N)</p> <p>Spatial Resolution: 8kmx8km degree grid box</p> <p>Temporal Resolution: 30-min</p> <p>Data Archiving Period: 1 January 1998 to the present</p> <p>Data Latency: 2 hours</p> <p>Data Format: plain binary format, NetCDF</p>	



## A45.06

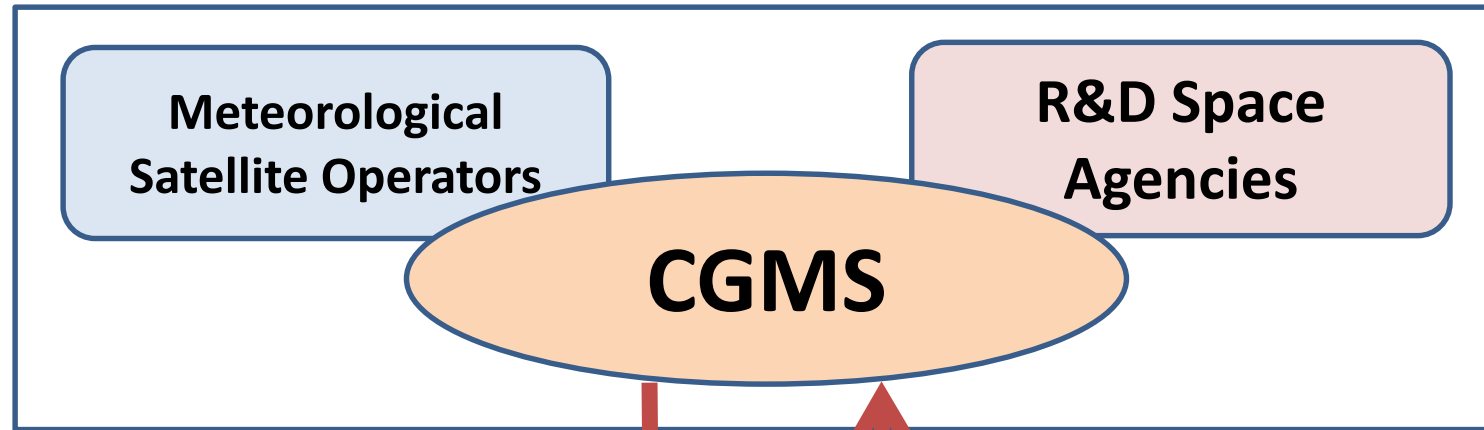
Product	Provider	Geophysical Parameter	Specification	Data Access/Documents
GSMaP	JAXA/EO RC	Precipitation (with rain gauge calibrated)	<p>Satellite(s): GPM-Core, GCOM-W1, NOAA series, MetOp series, TRMM, Aqua, DMSP series, Geo-stationary meteorological satellite</p> <p>Spatial Coverage:</p> <p>Spatial Resolution: 0.1 degree grid box</p> <p>Temporal Resolution: 1 hour</p> <p>Data Archiving Period: 1 March 2000 - current</p> <p>Data Latency:</p> <p>[GSMaP_NRT] 4 hours after observation</p> <p>[GSMaP_Gauge] 3 days after observation</p> <p>Data Format: plain binary format, text format</p>	<p><a href="http://sharaku.eorc.jaxa.jp/GSMaP/index.htm">http://sharaku.eorc.jaxa.jp/GSMaP/index.htm</a></p> <p><a href="http://sharaku.eorc.jaxa.jp/GSMaP/document/DataFormatDescription.pdf">http://sharaku.eorc.jaxa.jp/GSMaP/document/DataFormatDescription.pdf</a></p>





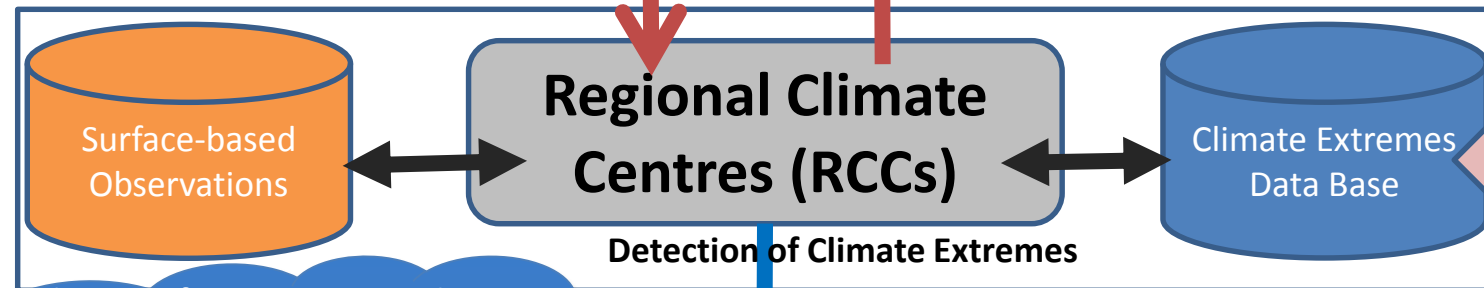
**Figure 1.** Schematic diagram of production pathways for various climate data record (CDR) products (ICDR—interim CDR, FCDR—fundamental CDR, TCDCR—thematic CDR, and CIR—climate information record) and their relative dependence along with their relationship with near-real time products: Sensor Data Records (SDRs) and Environmental Data Records (EDRs). Dash lines indicate optional paths.

## Implementation of SEMDP in East Asia Western Pacific



Provision of Satellite derived Products

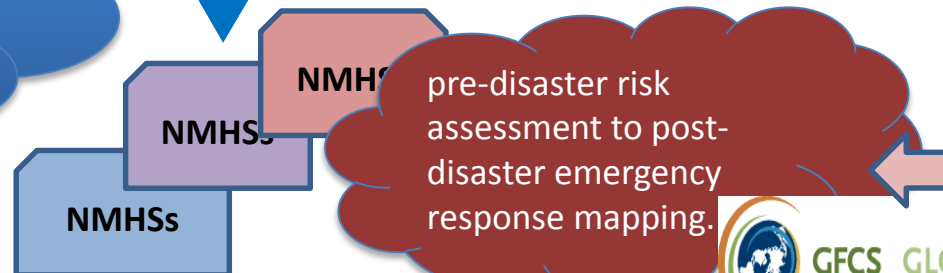
Evaluation/Validation of Products



sharing of experiences in the application of satellite products for monitoring weather & climate extremes initiation

Issuance of Guidance for Climate Extremes Monitoring

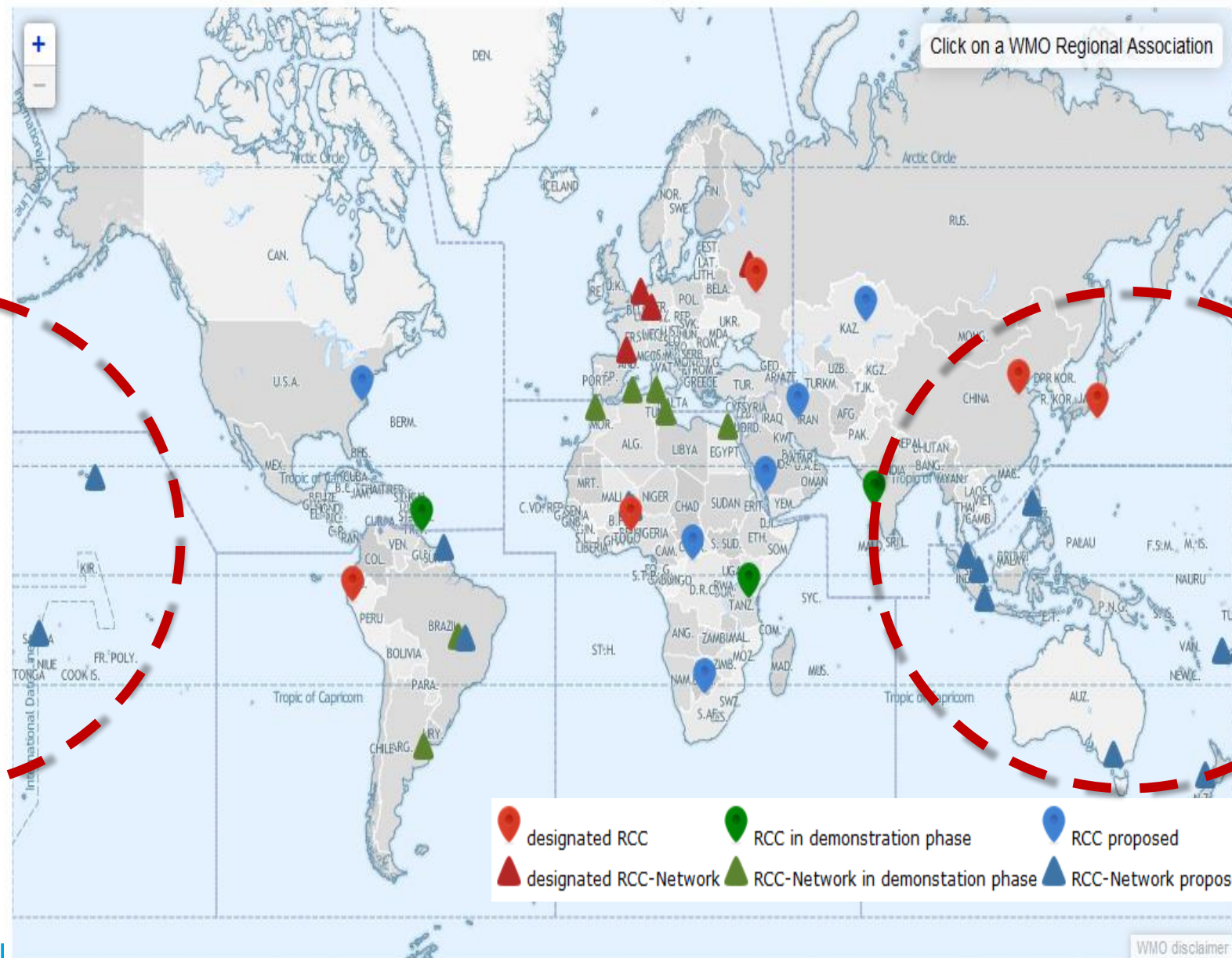
Utilization/Evaluation of Guidance



Capacity Building



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## The major milestones for the project in 2018

- WMO letter to launch SEMDP and nomination of SG-SEMDP to address to PRs by April 2018
- WMO letter of invitation to SEMDP Training Workshop by the end of July 2018
- WMO SEMDP Website linking to the web pages operated by GP-SAT, RCCs and NMHSs will be set up in August 2018
- Satellite derived products will be ready in August 2018
- Collecting in-situ data sets for the verification of satellite products by August 2018.
- Testing satellite products for producing climate indices, NCMP and characterization of extreme events by one month before the date of training workshop.
- The training workshop in conjunction with SG-SEMDP in October-November 2018

WEATHER CLIMATE WATER



WORLD  
METEOROLOGICAL  
ORGANIZATION



Space Wea

## Thank you

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Questions:  
[tkurino@wmo.int](mailto:tkurino@wmo.int)

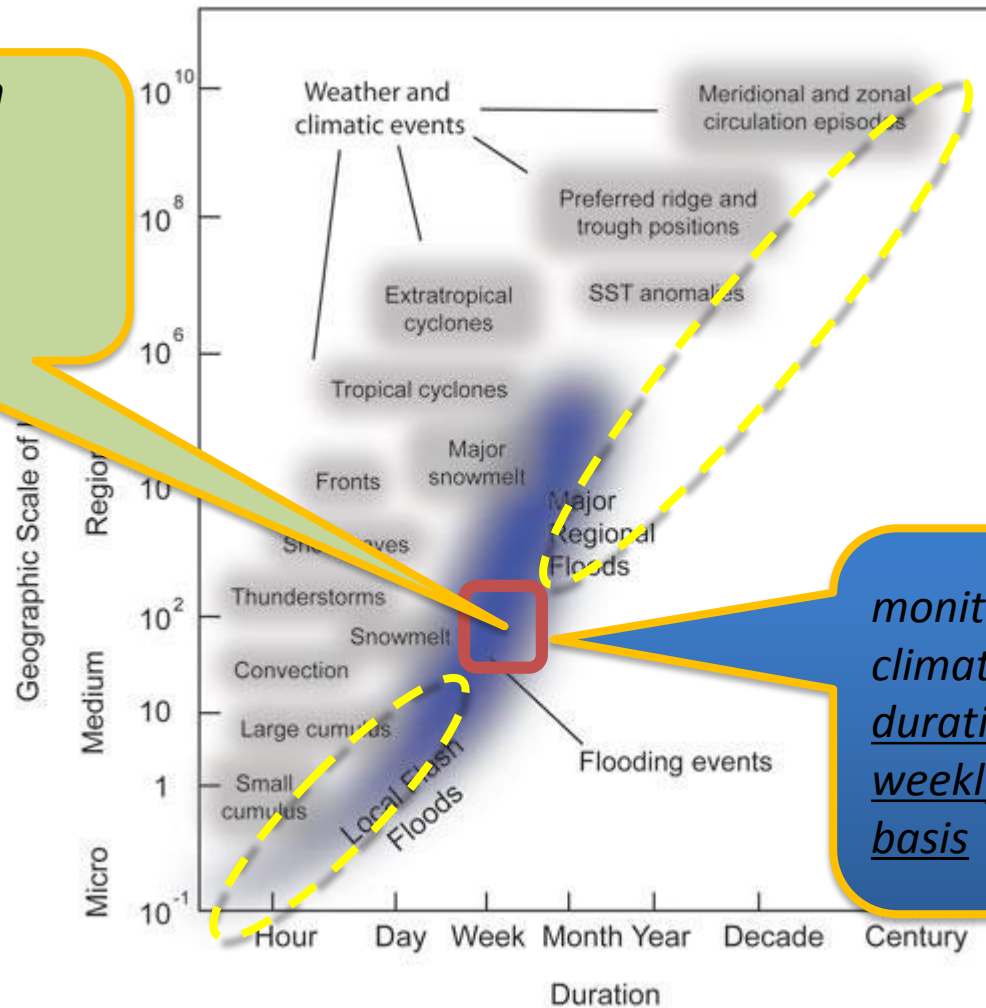
**Coordination Group for  
Meteorological Satellites**



**CGMS**



## Space-Time Domain of Weather, Climatic, and Flooding Events



*filling a gap between  
space-based  
“nowcasting” and  
“climate change  
monitoring”*

*monitoring weather and  
climate extremes in short  
duration on pentad or  
weekly basis up to monthly  
basis*

**Space-time domain of weather, climatic, and flooding events**

**(Katie Hirschboeck, The University of Arizona)**

**(<http://www.southwestclimatechange.org/impacts/water/floods#references>)**