



Committee on Earth Observation Satellites

Precipitation Virtual Constellation

Dr. Chris Kidd, NASA/UMD, Co-Lead P-VC

Dr. Riko Oki, JAXA, Co-Lead P-VC

CEOS SIT Technical Workshop 2020

Session 3.2 and Agenda Item #1

Virtual Meeting

8-10 and 15-17 September 2020





Leadership, membership, changes, meetings, etc.:

- **Transition of NASA co-lead from Gail Skofronick Jackson to Chris Kidd; JAXA Co-Lead to remain as Riko Oki.**
- **ISRO welcomed as a new P-VC member, and invitations being sent to agencies and organisations for representation on P-VC.**
- **Last meeting at NASA PMM in Indianapolis (Oct 2019), meeting at IPWG (CSU, CO; June 2020) postponed; P-VC-related telecons.**

Participated in CGMS WG2 and WG3 related actions set as:

- **- WG2 - IPWG to review the operational utilisations of spaceborne precipitation radar and to submit a report regarding the necessity of the precipitation radar;**
- **- WG3 - Ensure long-term continuity of Precipitation Radar measurements, which was proposed to add to the CGMS High-Level Priority Plan (HLPP) for 2020-2024.**



- **VC-20-13: Draft Precipitation Constellation White Paper has been prepared – see *below*.**
- **VC-20-14: IPWG/GEWEX Precipitation Assessment White Paper in progress; review meeting held 25/06/2020, follow up 15/09/2020.**
- **VC-20-15: Community engagement – furthering links with the CGMS International Precipitation Working Group (many are already involved with PVC and vice versa); virtual meeting on “The Global Satellite Precipitation Constellation” held 23/06/2020 (see IPWG web site).**
- ***CEOS Newsletter #55, Article on P-VC***
- ***CEOS Thematic Observation Coordination: “Precipitation Passive MW requirements”.***

Key paper being submitted to *Bulletin of the American Meteorological Society*, while IPWG/GEWEX is preparing a *Precipitation Assessment* white paper.





The Global Precipitation Measurement (GPM) mission is *the* realisation of the P-VC

Constellation of international satellites with passive/active microwave sensors, supported by geostationary IR observations

- **The Core Observatory (CO) is provided by NASA and JAXA;**
- **A constellation of c.10 international partner satellites contributed by NOAA, EUMETSAT, ISRO/CNES, JAXA;**
- **Generation of operational precipitation products from CO and partner sensors, cross-calibrated by the CO precipitation radar;**
- **Global precipitation products available at 10-km/30-minute (or better) through merged schemes (e.g. IMERG, GSMaP) - as ARD;**
- **GPM provides a focus for a strong international precipitation community, through NASA (and equivalent) JAXA science teams, and the International Precipitation Working Group (IPWG) of the CGMS.**

Measuring Global Precipitation

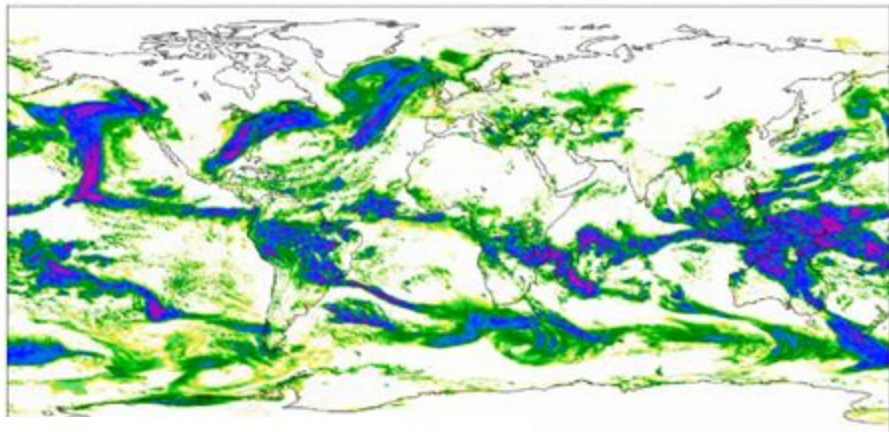
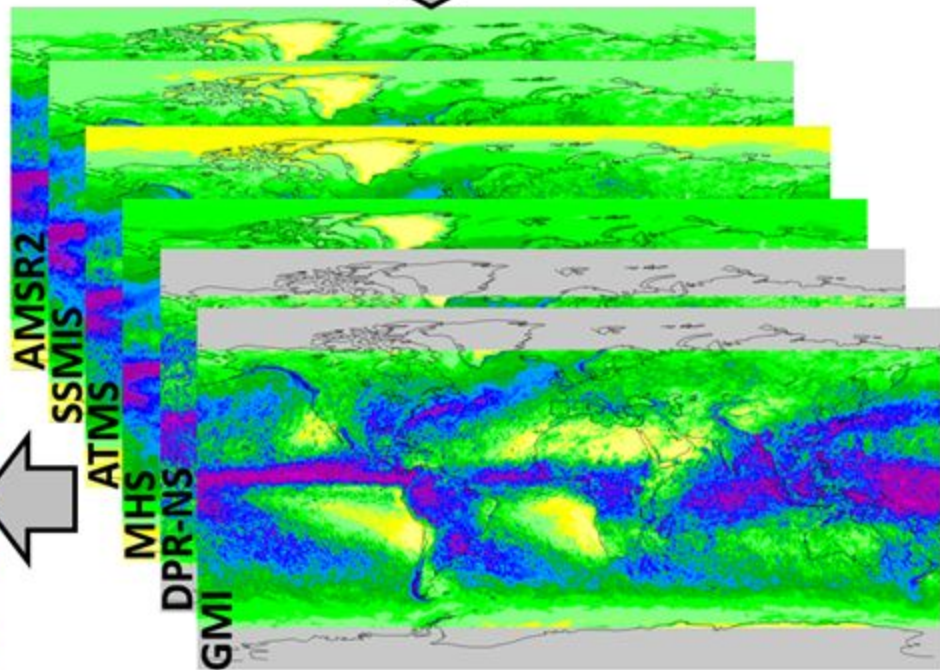


Exploiting multi-satellite, multi-sensor retrievals



Instantaneous

Consistent retrieval scheme across all sensors



10-km 30-minute (or finer)



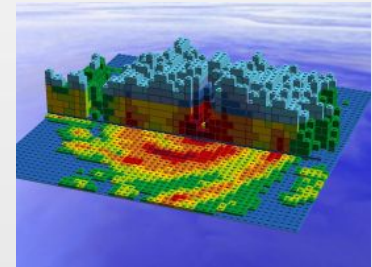
The GPM Precipitation Community



GPM Communications & Outreach (last 3 years)

Active presence on the web, social media, publications, events, visualizations, print/online materials, stakeholder and community engagement and innovative data access tools:

- **5.73 million people (online activities) and 34,500 in person**
- **66,000 page-views/month (GPM main page)**
- **172,000 page-views/month (Education page)**
- **53,000 followers on Facebook and 28,000 followers on Twitter**
- **50 lesson plans (K-12) and application workshops**
- **3D LEGO GPM Spacecraft and hurricane model**
- **c.30 formal GPM international partners, incl JAXA**
- **Conference sessions devoted to precipitation (AGU, JpGU, EGU, AOGS, IGARSS, etc)**



Engagement with International Precipitation Working Group (IPWG)

IPWG is a permanent Working Group of the Coordination Group for Meteorological Satellites (CGMS).

Focuses the science community on operational and research satellite-based quantitative precipitation measurement, issues and challenges.

Formed in 2001, IPWG currently has 480 members from 52 countries and 5 international organisations.

Biennial meetings with student training sessions (2020 held virtually).



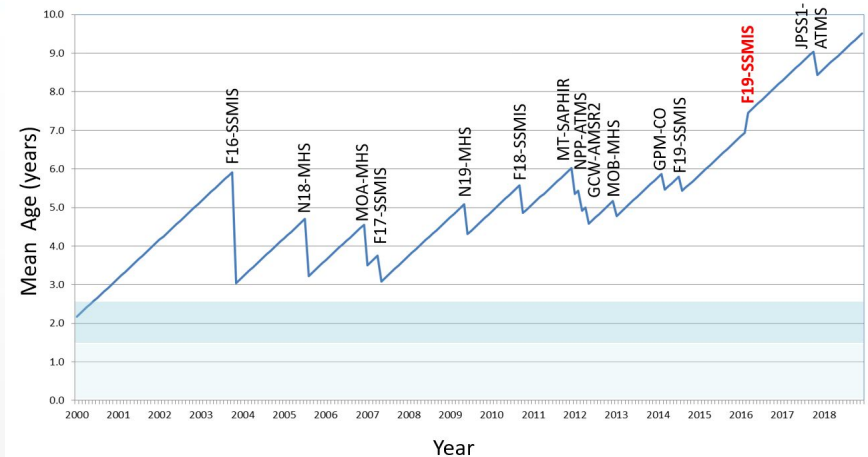
IPWG-9, Yonsei University, Seoul, 2018



The average age of the satellites within the Precipitation Constellation now exceeds 10 years. Things break.

New missions include:

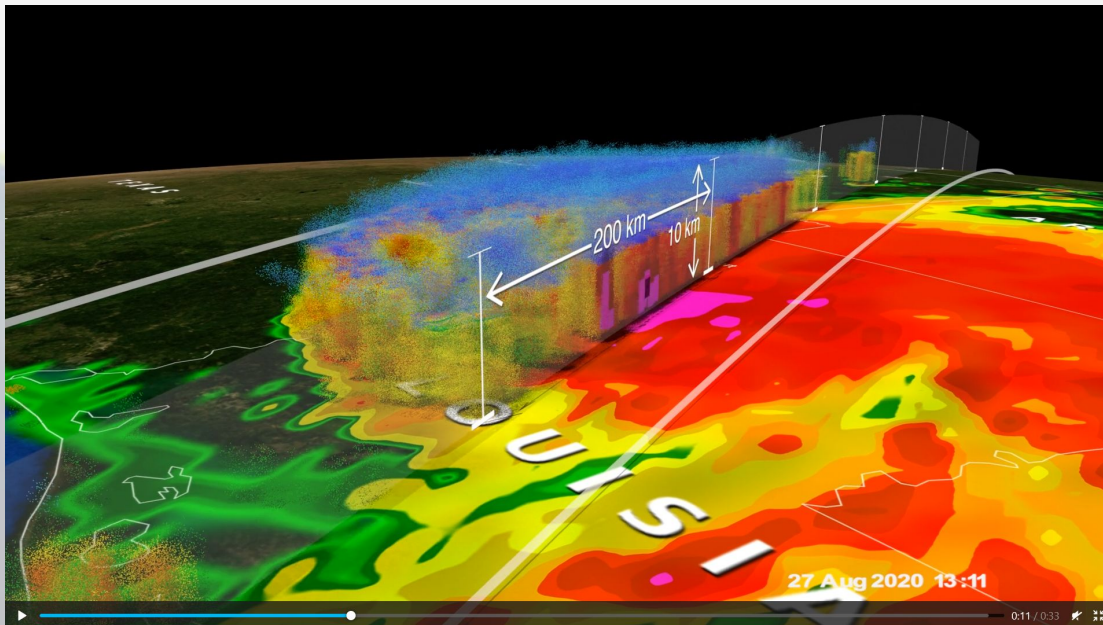
- **TROPICS:** constellation of 6 cubesats with MW sounders, +1 pathfinder to be launched June 2021;
- **ESA EarthCARE** - aerosols/clouds, but precipitation capability (2021+);
- **NOAA/EUMETSAT:** JPSS (*sounders only*) and EPS-SG (2023+);
- **AMSR-3:** continuation of AMSR series (*funded – 2023/24 launch*);
- **FY-3G/G' Rain Mapping mission, imager & radar (2022+);**
- **WSF-M: US DoD follow-on to the DMSP-series (x2);**
- **ACCP: shortlisting of system architectures (launch timeframe c.2029).**





P-VC is recruiting!

- two IPWG co-chairs are now part of the P-VC membership;
- IPWG rapporteur to CGMS has also joined;
- Invitations going out to key agencies and organisations to be represented on the P-VC.



Hurricane Laura
27 August 2020 13:11Z
over Louisiana captured
by the GPM GMI and DPR.
2D surface precipitation
from IMERG, 3D
precipitation from DPR.