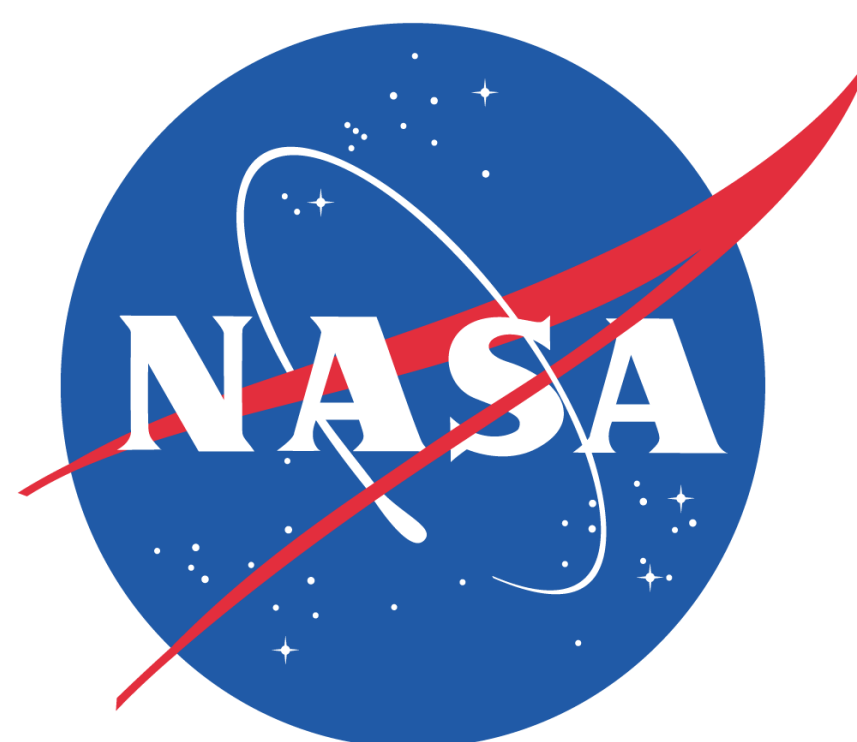




Oceanic Validation of IMERG Version 7 with the GPM Validation Network

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Aims

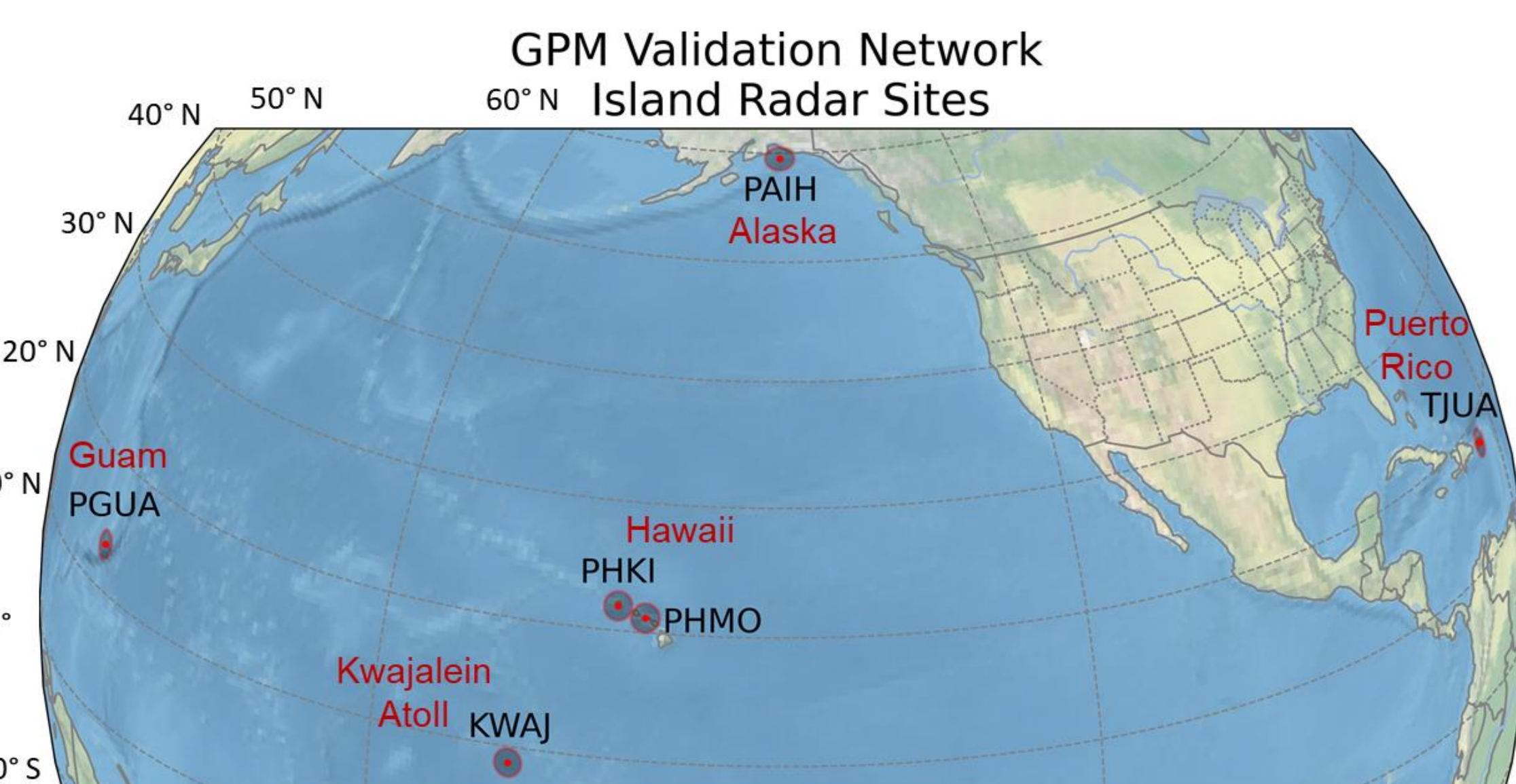
- To **validate Version 7** of the Integrated Multi-satellite Retrievals for the Global Precipitation Measurement (GPM) mission (**IMERG**) **over tropical and high-latitude oceans** using the GPM Validation Network (VN).
- To **trace errors** from the Level-3 **IMERG V07** product **back through** to the **input** Level-2 Goddard Profiling Algorithm (**GPROF**) **V07** product for the GPM Microwave Imager (**GMI**).

Overview

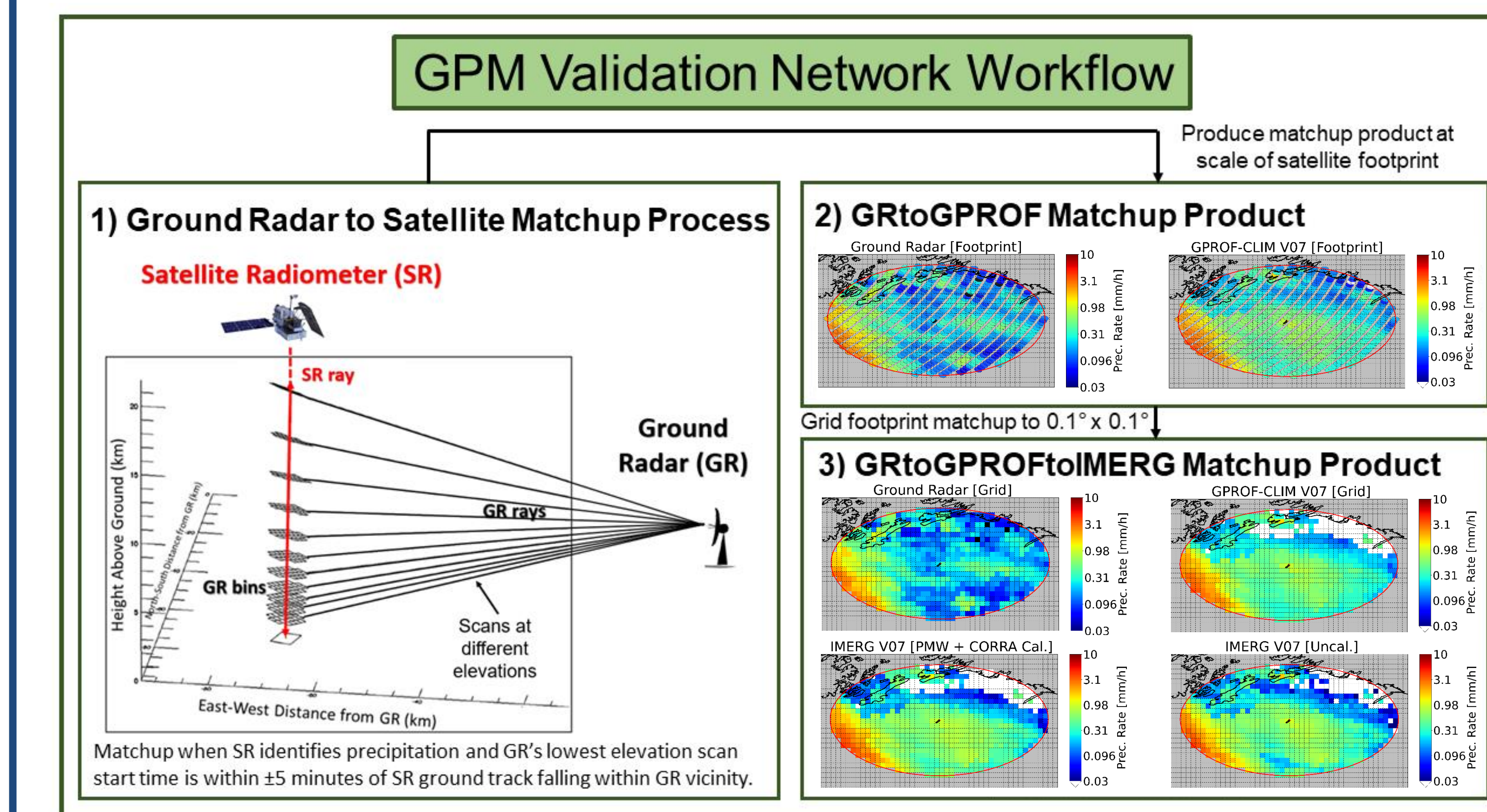
- What: Evaluation of IMERG V07
- Where: Alaskan and tropical oceans
- When: GPM Era (June 2014 to October 2022)
- Why: **First IMERG V07 oceanic validation**; Understanding of IMERG performance over ocean is limited to date
- How: GPM Validation Network Version 2.3 (comparison with ground radars)

The GPM Validation Network

The GPM VN geometrically matches 3D precipitation retrievals from GPM Core sensors to 118 ground-based radars (GRs), including 6 island-based radars.



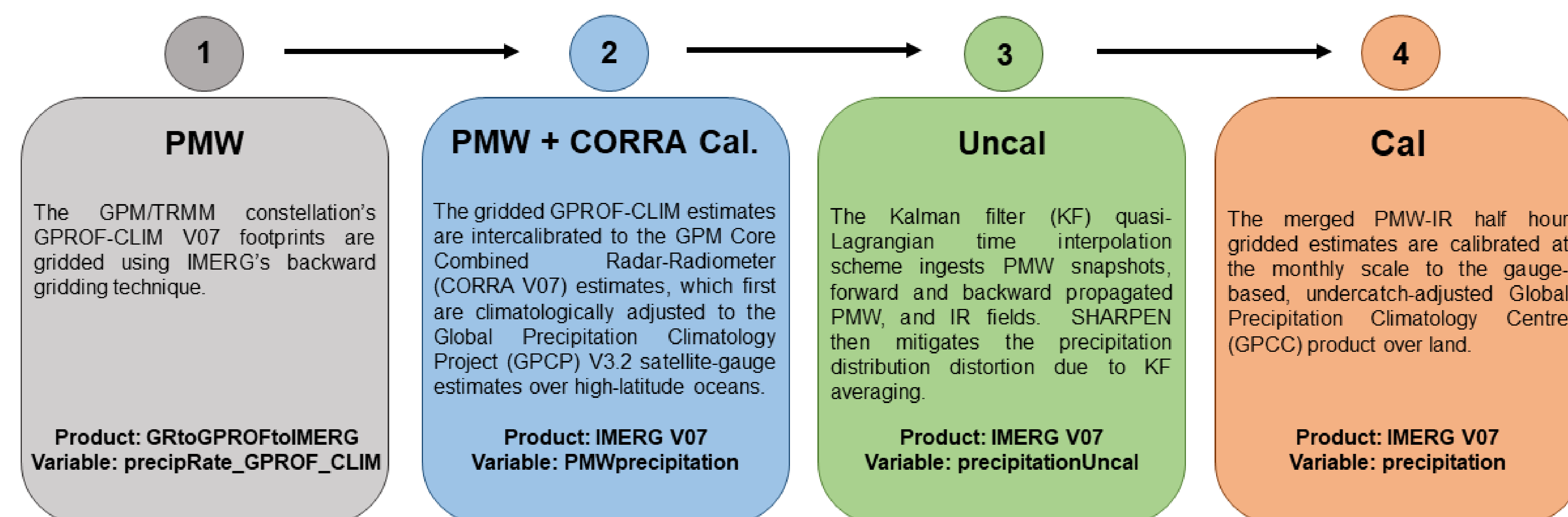
The VN's GR-to-GPROF matchups can be gridded to validate IMERG against the GR data, and enable error tracing from IMERG back through to GPROF-GMI.



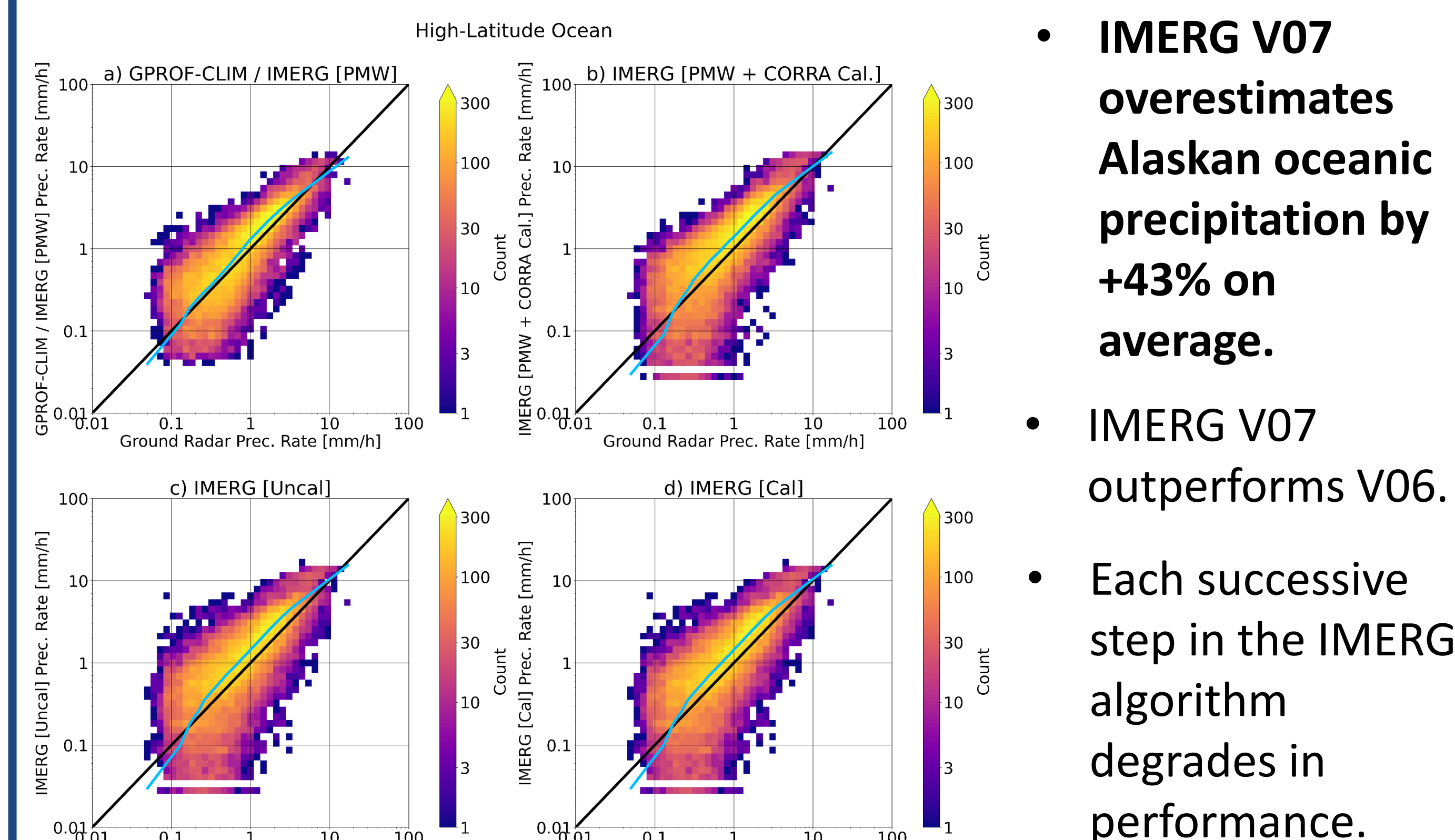
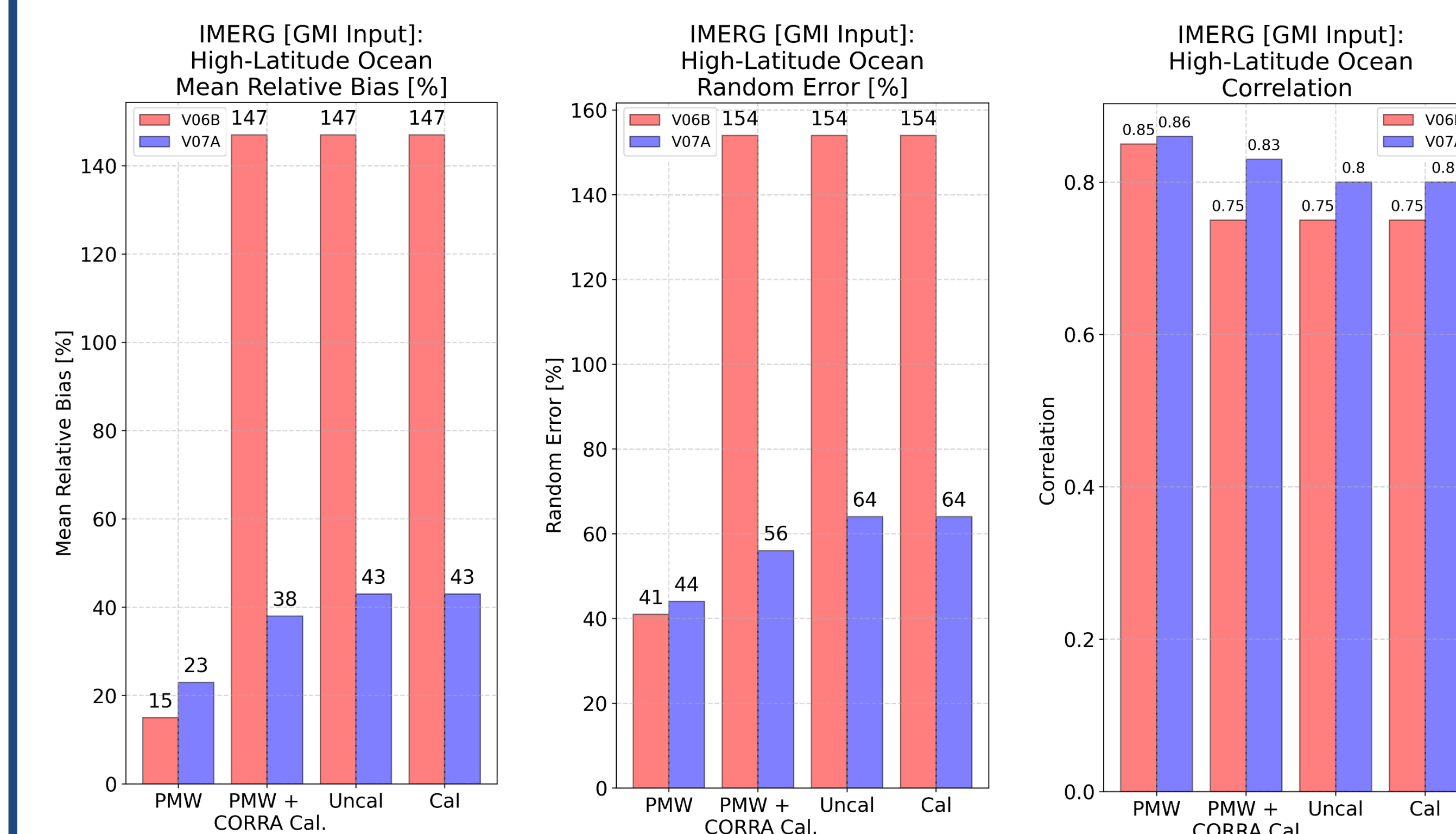
IMERG Error Tracing

- The GPM VN enables full error tracing from GPROF through to IMERG for the GMI.
- Gridded GPROF Climate (GPROF-CLIM) GMI precipitation rates, without any calibration applied by IMERG (algorithm step 1 - PMW), are only available from the GPM Validation Network. The GPROF-CLIM data are gridded using IMERG's backward gridding code.
- For GMI over ocean, the combination of instantaneous GMI estimates with propagated imager estimates in the Kalman filter is conducted, unlike in V06.
- GPCP V3.2 influences high-latitude oceanic precipitation retrievals in IMERG V07, but not tropical oceanic precipitation retrievals.

IMERG V07 Algorithm

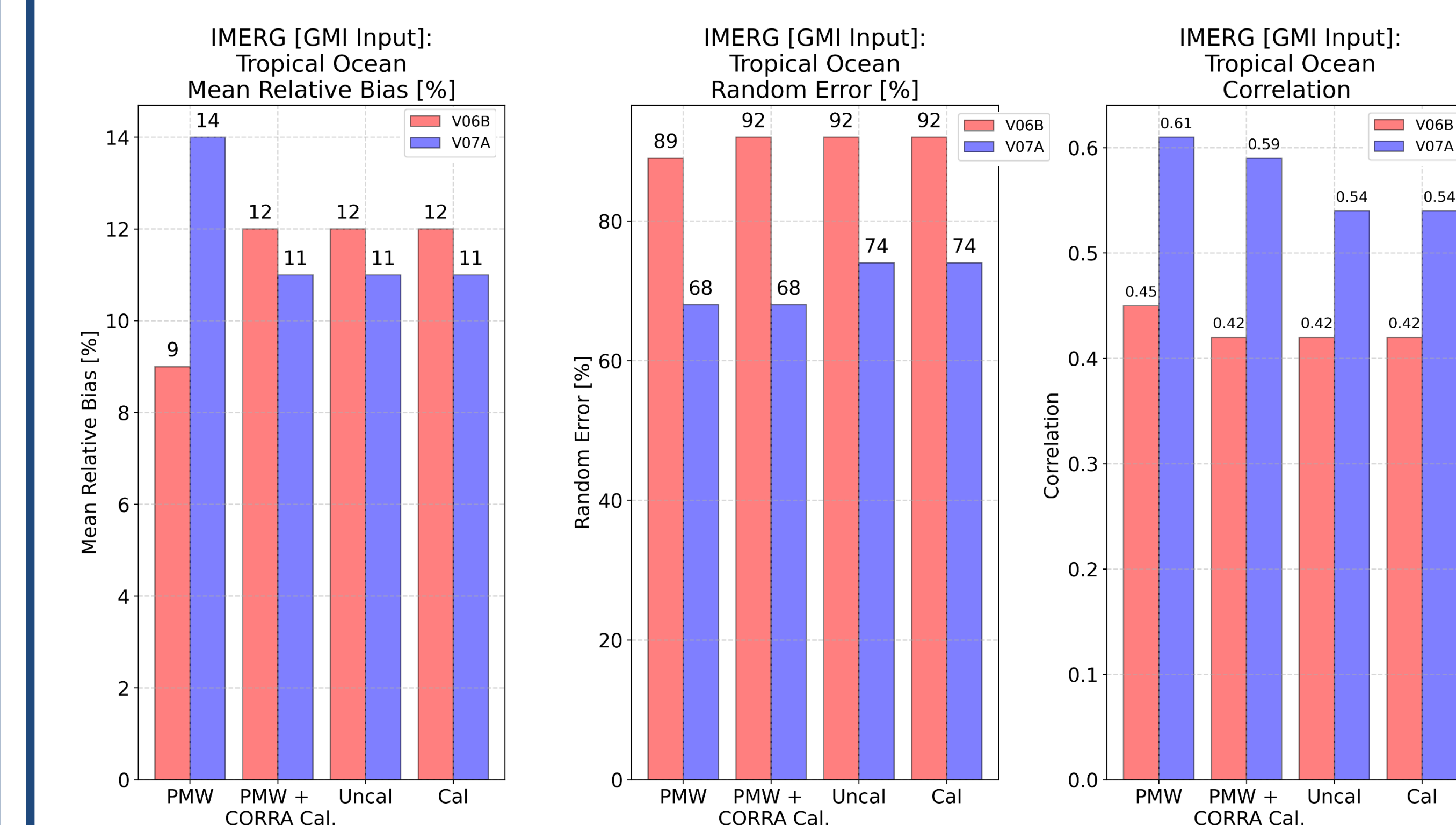


Alaskan High-Latitude Oceanic Results



- IMERG V07 overestimates Alaskan oceanic precipitation by +43% on average.**
- IMERG V07 outperforms V06.
- Each successive step in the IMERG algorithm degrades in performance.

Tropical Oceanic Results



- IMERG V07 overestimates tropical oceanic precipitation by +11% on average.**
- IMERG V07 improves random errors and correlations over the tropical ocean.