

Comparison of GMI and DPR over the Mountainous Terrain of Western North America

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Questions:

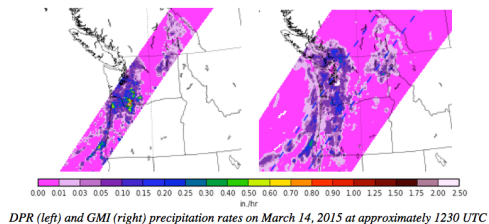
- How does the DPR and GMI compare over the substantial terrain of western North America?
- How well does DPR document orographic precipitation?
- Does DPR precipitation look like the NOAA WSR-88D radars over and near terrain? How well does GMI duplicate the DPR and WSR-88D precipitation patterns over and near terrain?

Approach:

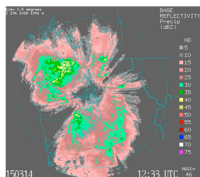
- Subjectively compare GMI and DPR precipitation rate swaths to each other and to WSR-88D radar when available.
- Evaluate from June 1, 2014 to now
- Quantitative evaluation will occur in proposed future project.

Orographic Precipitation:

An example of one GPM pass on March 14, 2015 is shown below (at approximately 1230 UTC). The DPR precipitation has intense orographic precipitation on the windward side of the Cascades and the coastal mountains. The WSR-88 radar at Camano Island, at approximately the same time, shows that both strong windward enhancement and lee rain shadowing were occurring. In contrast, the orographic enhancement is less pronounced in the GMI imagery, particularly regarding the intensity of precipitation on the windward slopes.



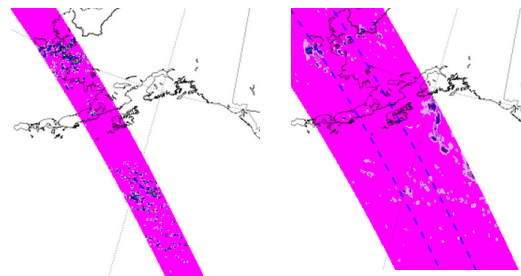
DPR (left) and GMI (right) precipitation rates on March 14, 2015 at approximately 1230 UTC



NWS Camano Island radar reflectivity at 1233 UTC March 14, 2015

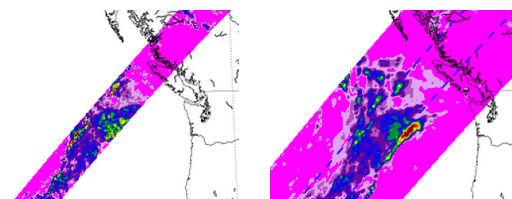
Open Cellular Convection

Open cellular convection (OCC) is often apparent over the ocean as cold continental air moves over warmer water. The DPR (left panel) does a good job in defining areas of OCC, while GMI (right panel) misses much of it and smears out the remainder.



Frontal Structures Over the Pacific

Over the Pacific there are often well-defined frontal precipitation structures. As shown below, although GMI (right panel) gets the general areas correct, it fails to define the high-intensity areas in the frontal zone defined by DPR (left panel).



Conclusions

Based on over a year of subjective evaluation, DPR does an excellent job in defining mesoscale areas of precipitation, including orographic precipitation, open cellular convection, and frontal rain bands. GMI defines synoptic areas of precipitation well, but has substantial difficulty in defining the intensity and sometimes existence of smaller scale precipitation features.