

Convective/Stratiform classification from passive microwave observations alone

S. Hristova-Veleva^{1,2}, Eun-Kyoung Seo³, Z. Haddad^{1,2}

svetla.hristova@jpl.nasa.gov

¹ – Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109

² – JIFRESSE, UCLA

³ – Kongju National University

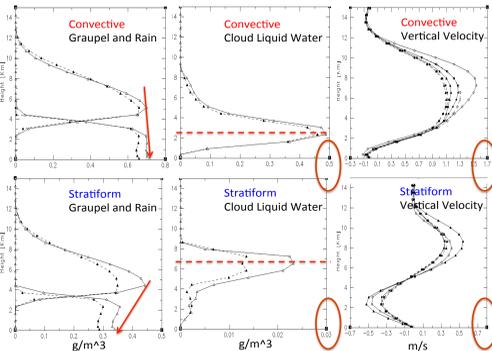
Motivation

Physically-based retrievals are critically dependent on the assumptions that went into building the retrieval database (the relationship between the observables and the parameters of interest).

The critical assumptions that affect rain retrievals from microwave observations vary significantly as a function of the rain type.

Precipitating regions can be classified into two basic types – convective or stratiform – with very different properties.

- Convective and stratiform regions are characterized by different:
 - dynamics,
 - microphysical processes
 - spatial variability.



A critical step toward improving rain estimation from passive microwave observations requires:

- developing the ability to distinguish the dominant type within each satellite Field-Of-View; and
- the design of appropriate retrieval databases that reflect these basic differences.

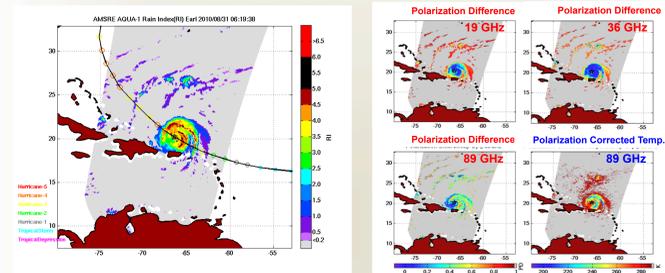
Basic Ingredients:

- The Rain Indicator – a multi-channel depiction of the storm structure

Hristova-Veleva et al., 2013: "Revealing the Winds Under the Rain. Part I. Passive Microwave Rain Retrievals Using a New, Observations-Based, Parameterization of Sub-Satellite Rain Variability and Intensity: Algorithm Description", 2013, JAMC 52, 2828-2848

Microwave signals at the top of the atmosphere can be classified into two categories:

- emission signal - dominant at lower frequencies; warming; better for light rain. Strong emission in the atmosphere reduces the polarization difference (PD) in the ocean surface radiation. Hence, PD is representative of the atmospheric emission.
 - scattering signal - dominant at higher frequencies; cooling; better for heavy rain; PCT
- Hence, both signals have to be incorporated to cover the entire rainfall spectrum.



Retrieval of Geophysical Parameters

- > Rain Conditions – How good is the Rain Indicator

