March 3rd, 2016

Release Notes for GPM CSH Products

The CSH LH products strongly depend on the surface rainfall amount and its stratiform component (%).   Heating depth is indirectly inferred from the use of conditional surface precipitation rates.

The CSH and SLH LH products are based on heating look-up tables (LUTs).   The LUTs are generated from a high-resolution cloud-resolving model (i.e., the Goddard Cumulus Ensemble model), which can typically produce/simulate Q1 profiles (i.e., LH+Eddy+Qr) that are in good agreement with sounding estimates.

However, the current LUTs are only based on a limited number of cases (several tropical oceanic but only a couple continental).   Please see Tao et al. (2010).

For GPM LH products, the LUTs need to include cases associated with fronts and snow events, including mid-latitude synoptic and winter storms (please see the cases shown in the table in the next slide).   These same cases will also be used to generate the LUTs needed for the SLH algorithm.

Tao, W.-K., S. Lang, X. Zeng, S. Shige, and Y. Takayabu, 2010: Relating convective and stratiform rain to latent heating, J. Climate, 23, 1874-1893.

Field experiment	Location	Period	Reference
C3VP	Canada	Winter 2006-2007 20-22 January 2007	Shi *et al.* (2010); Iguchi *et al.* (2012)
MC3E	Ponca City, OK	22 April - 3 June 2011 25 April, 1 May, 20 May, 23-24 May	Petersen and Jensen (2012) Tao *et al.* (2013, 2015) Iguchi *et al.* (2012)
LPVEx	Helsinki, Finland	Fall-Winter 2010	Iguchi *et al.* (2014)
GCPEx	Ontario, Canada	January-February 2012	
IFloodS	Iowa	1 May - 15 June 2013	Wu *et al.* (2015)
IPHEX	North Carolina	1 May - 15 June 2014 15 May, 30 May	A. Barros (Duke U)
OLYMPEX	Olympic Peninsula in the Pacific Northwest	November 2015 – February 2016	R. Houze (U. Washington)
Snow/Frontal Events	Heavy and moderate snow events over the eastern US	16 March 2014 17, 22 February 2015	

Red: High priority, will simulate with NU-WRF

Green: Low priority