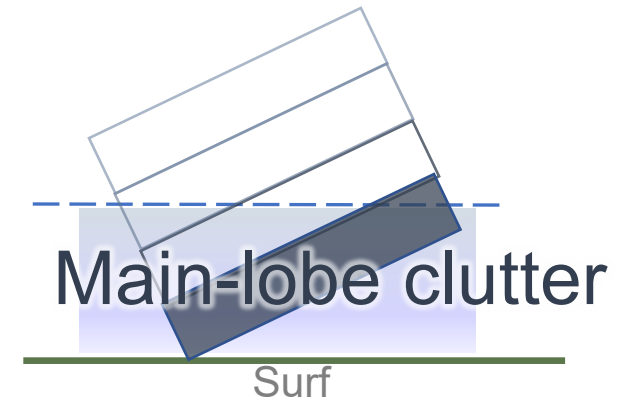


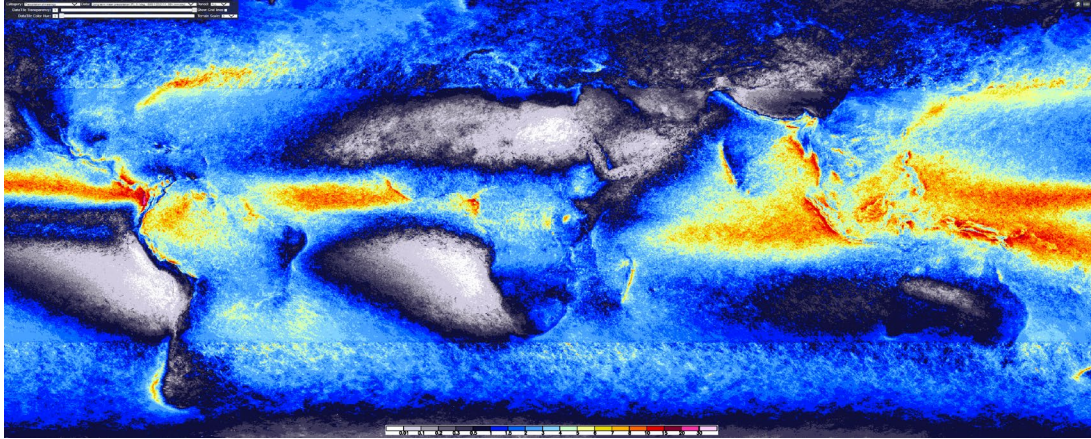
Retrieval uncertainties related to clutter removal in spaceborne precipitation radar data

Masafumi Hirose  
Meijo University



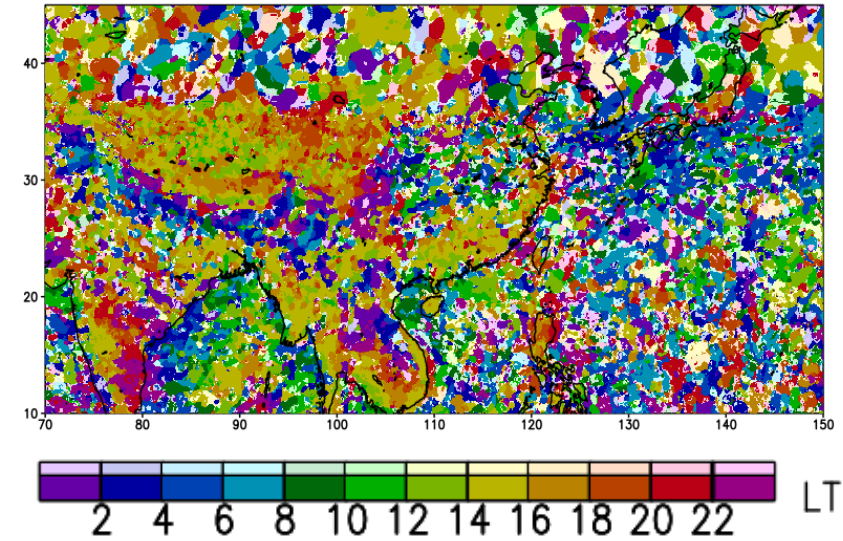
# High-spatial resolution precipitation statistics by long-term spaceborne radar data

0.1-deg precipitation map not using coastline information



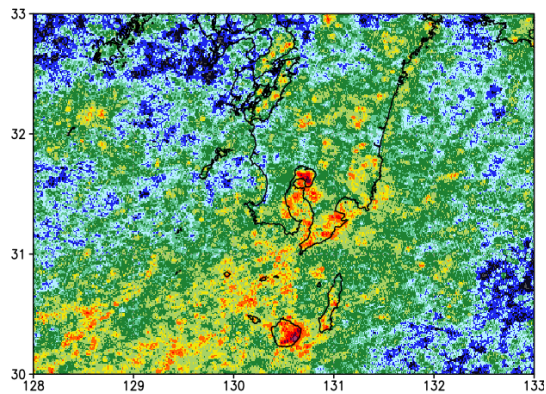
PR+KuPR 98-21, <https://www.rain-clim.com/>

Time of max rain  
in July based on 25-yr spaceborne radar data, 0.1deg., w spatial filter ensuring >5000 samples

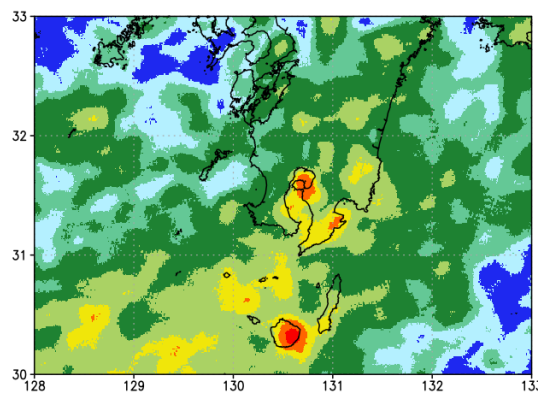


Long-term mean precipitation around Kyushu area in Japan

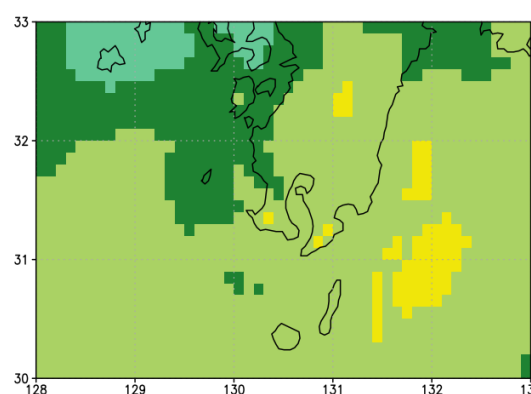
TRMM PR 07A, 0.01°



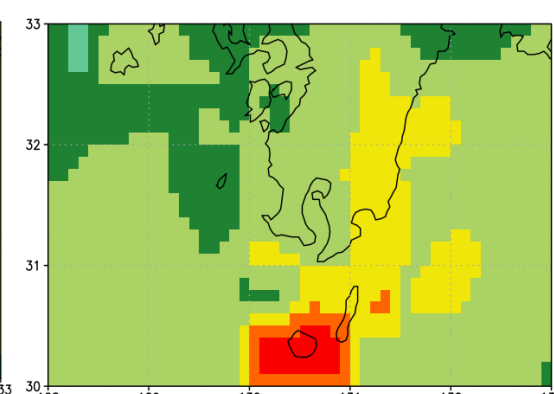
Ave within a 10-km radius



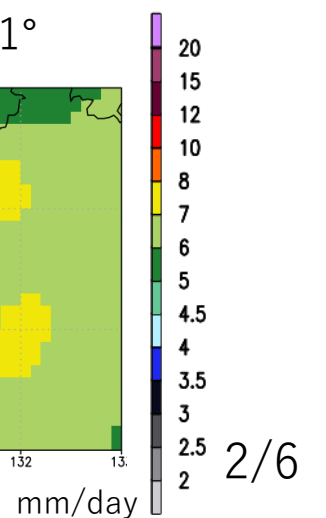
GSMaP MVK v8, 0.1°



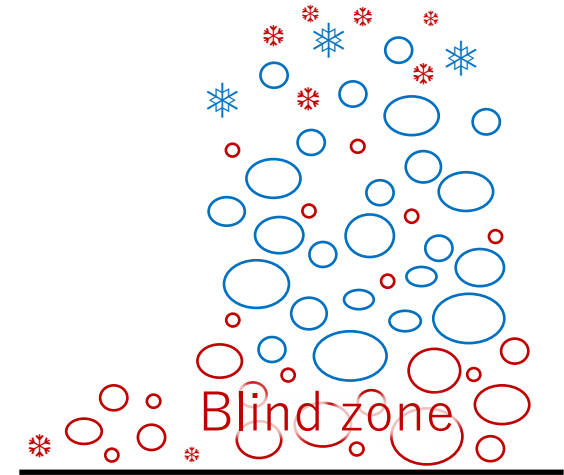
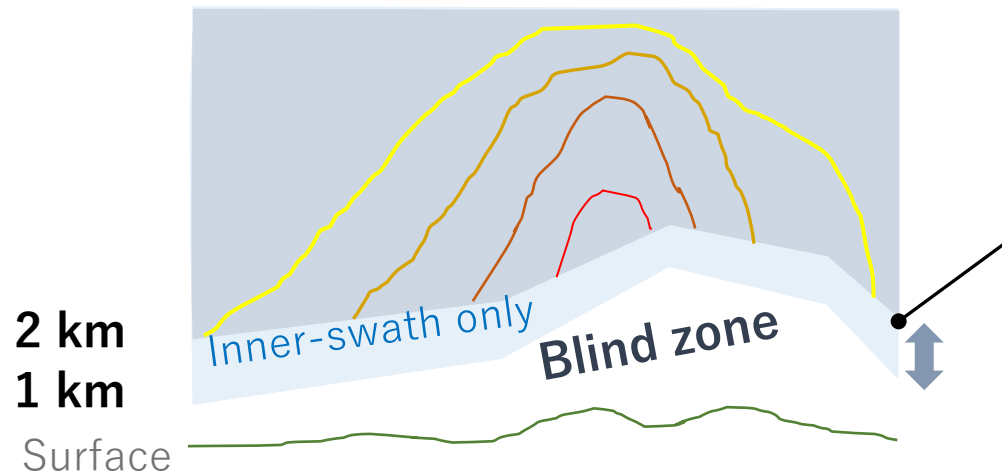
GSMaP gauge v8, 0.1°



(Hirose and Okada 2018, *JAMC*)



# Retrieval errors of spaceborne radar dependent on terrain

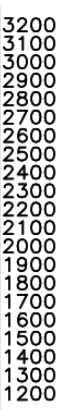
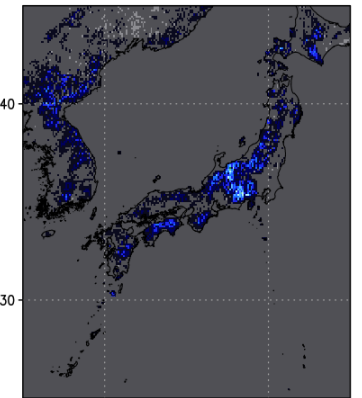
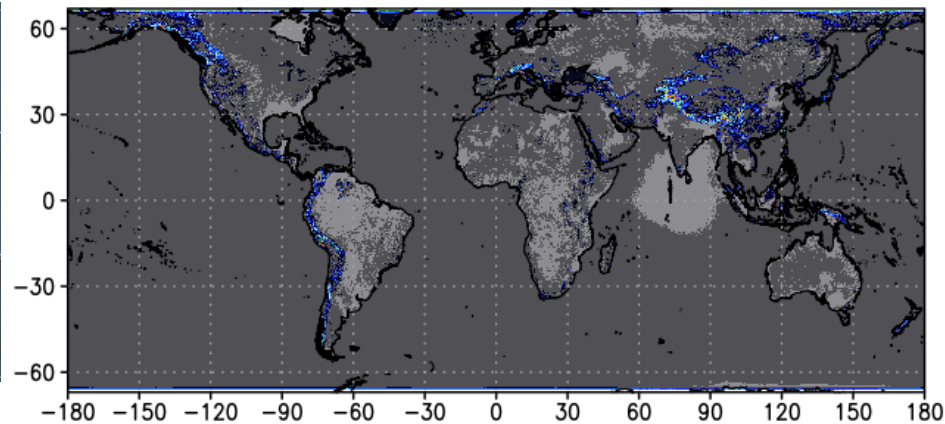
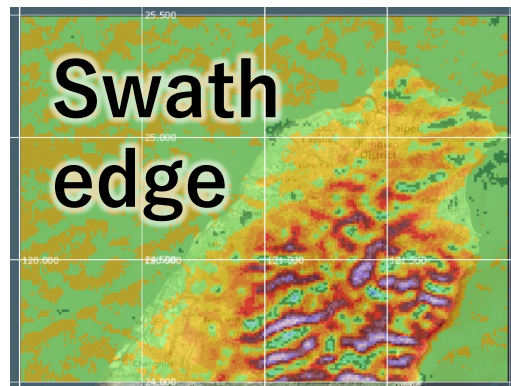
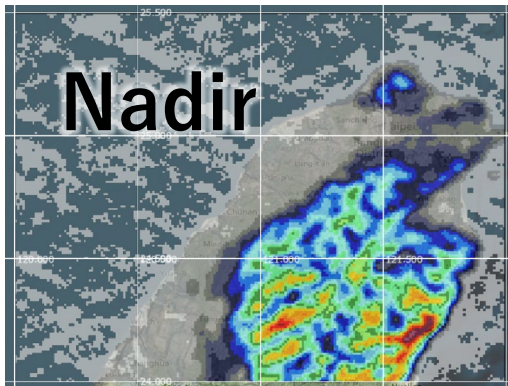


CFB level, Northern Taiwan

PR v8, 0.01 deg

CFB level

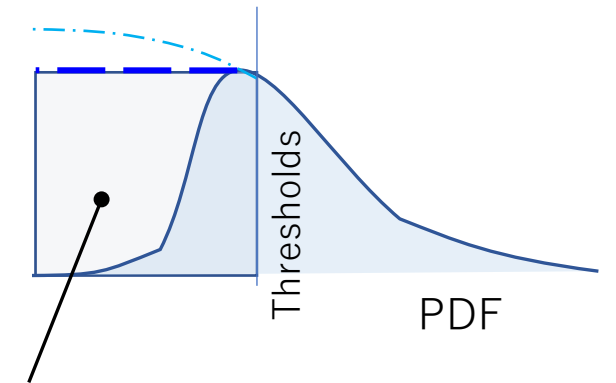
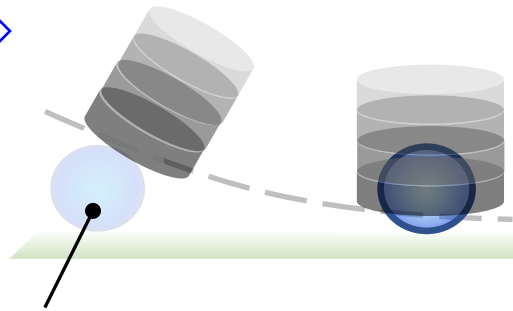
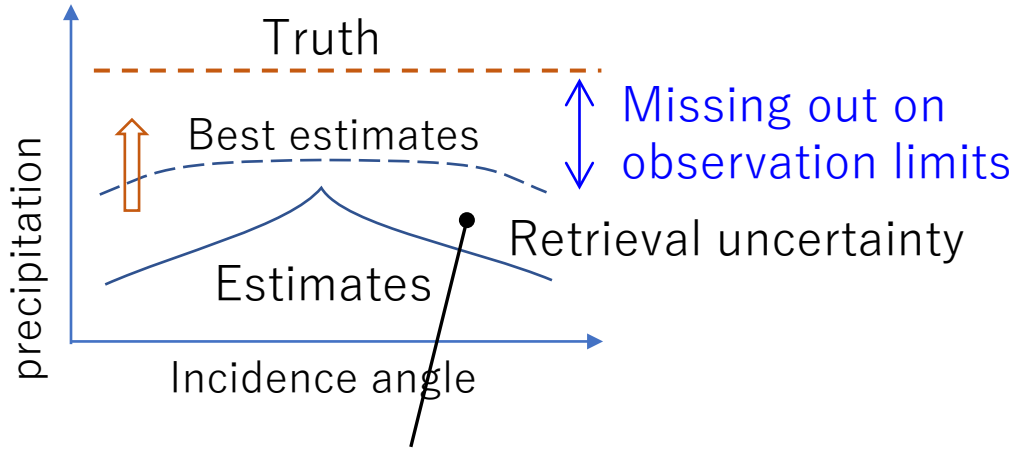
KuPR 06A 2014/6-2019/5



m



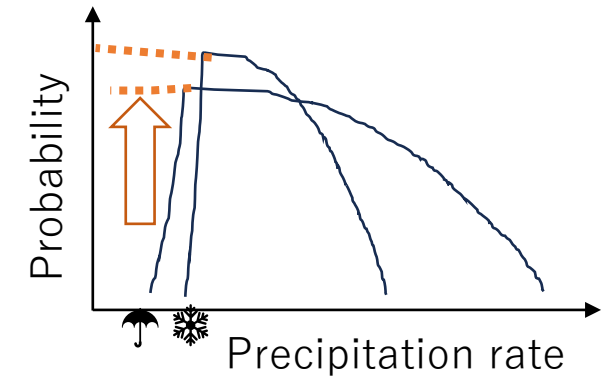
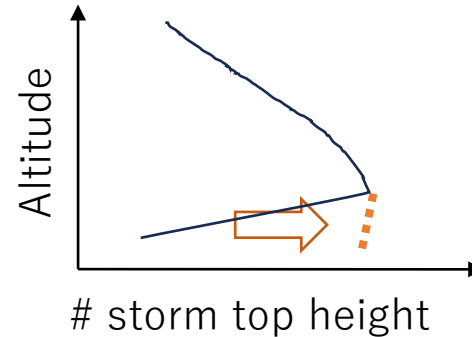
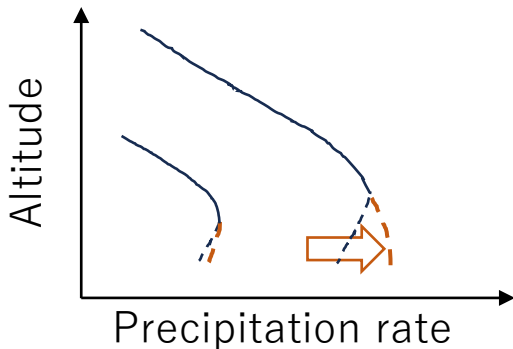
# Impact associated with the changing CFB



1. Correction of **Low-level precipitation profile (LPP)** assumption (Hirose et al. 2021)

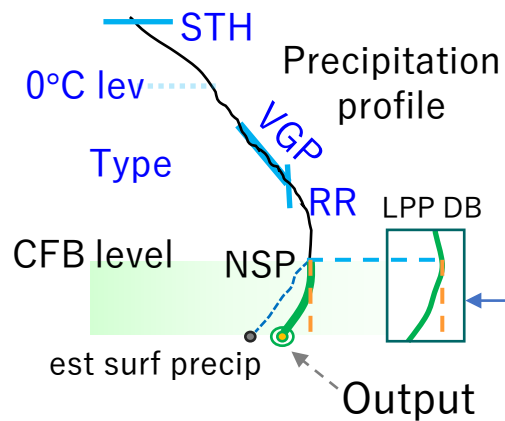
2. Contribution of **missing shallow storms** (Hirose et al. 2021)

3. Contribution of precipitation below sensitivity



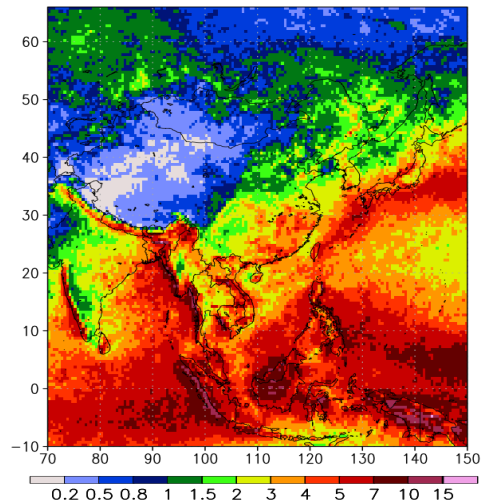
# Effect of new LPP correction

Input variables

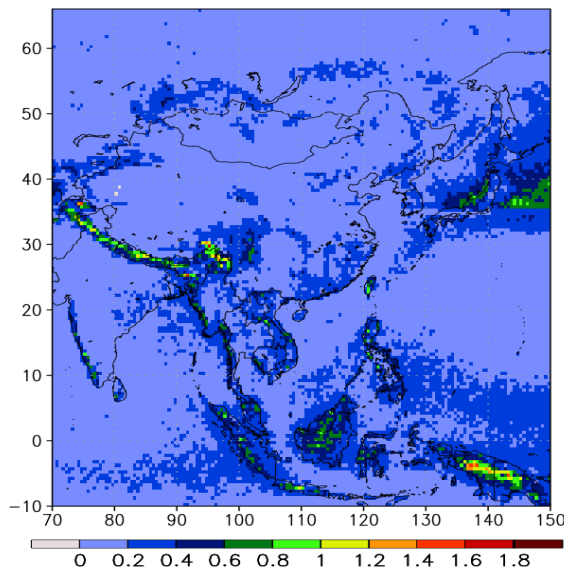


A priori LPP dataset based on the Near-Nadir data classified by:  
 Strat/Conv/Others,  
 Land/Ocean, 0°C level,  
 Storm top height, Vertical gradient of precipitation rate, Precipitation aloft +CFB level

Precipitation [mm/day]

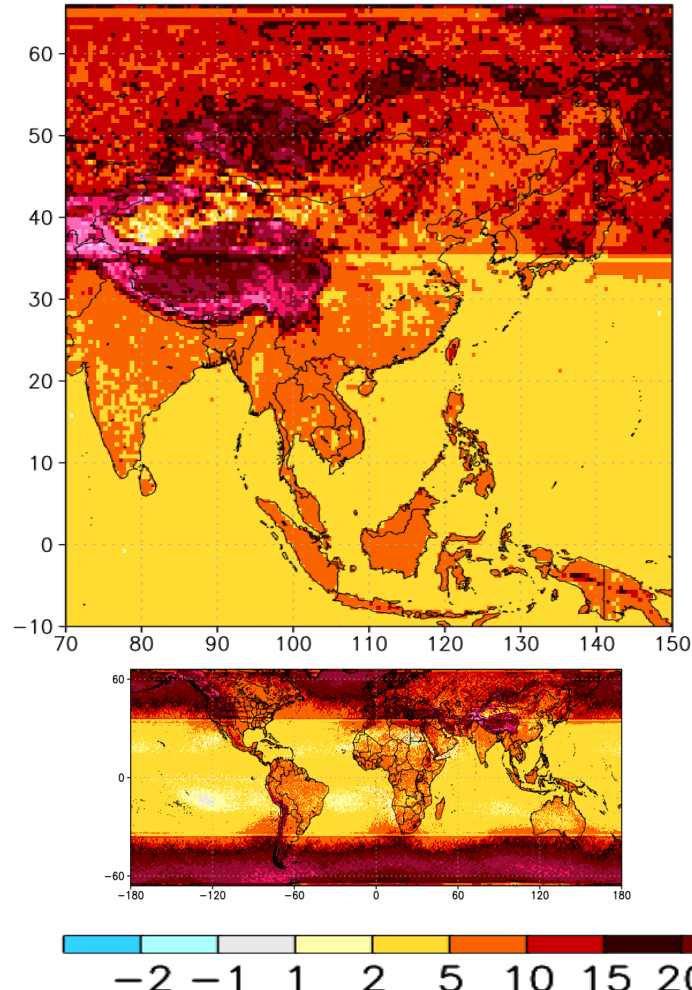


$R_{cor} - R_{org}$  [mm/day]

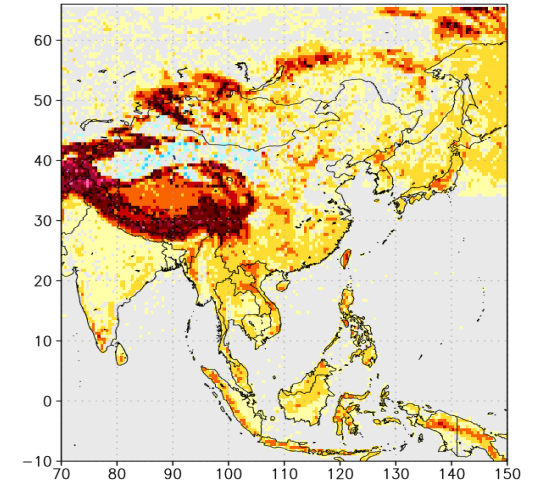


TRMM PR 07A 1998/1-2014/10,  
 GPM DPR KuPR 07A 2014/4-2023/6  
 0.5 deg.

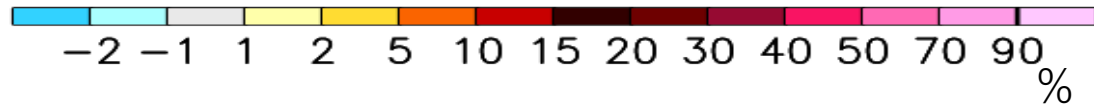
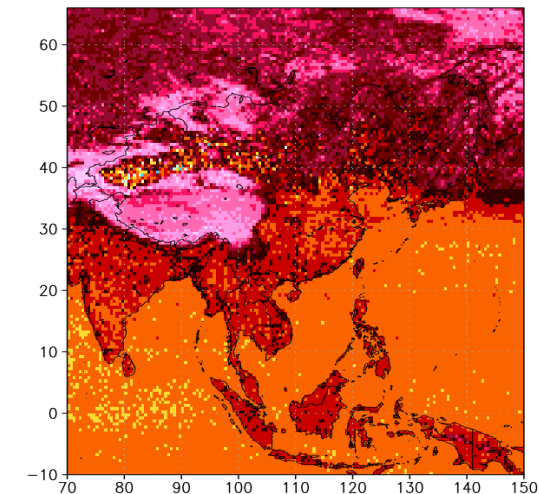
All angle data, 49 bins, 1-49th



Near Nadir data  
 9 bins, 21-29th



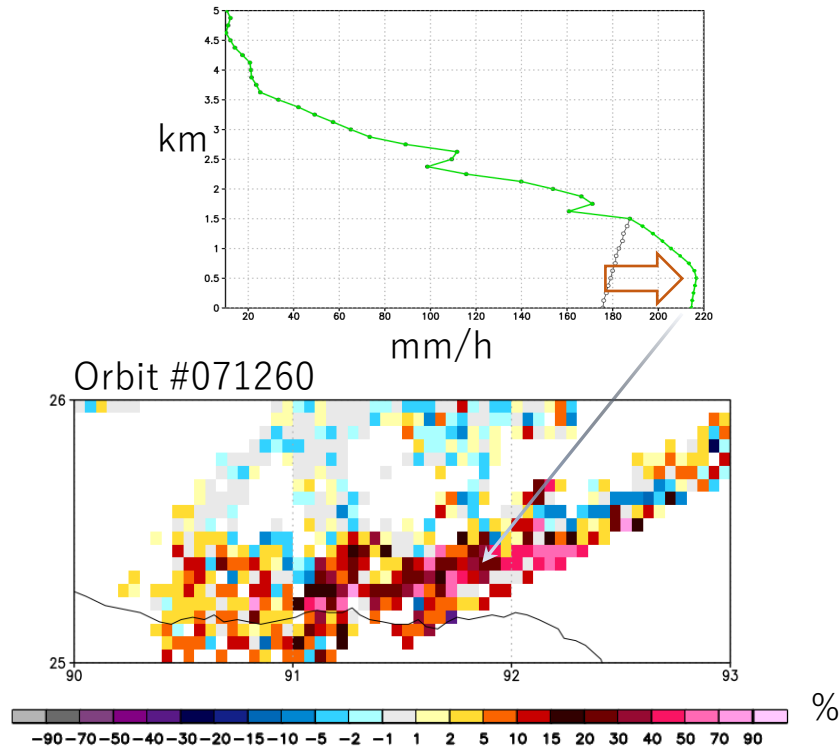
Swath Edge data  
 10 bins, 1-5 & 45-49th



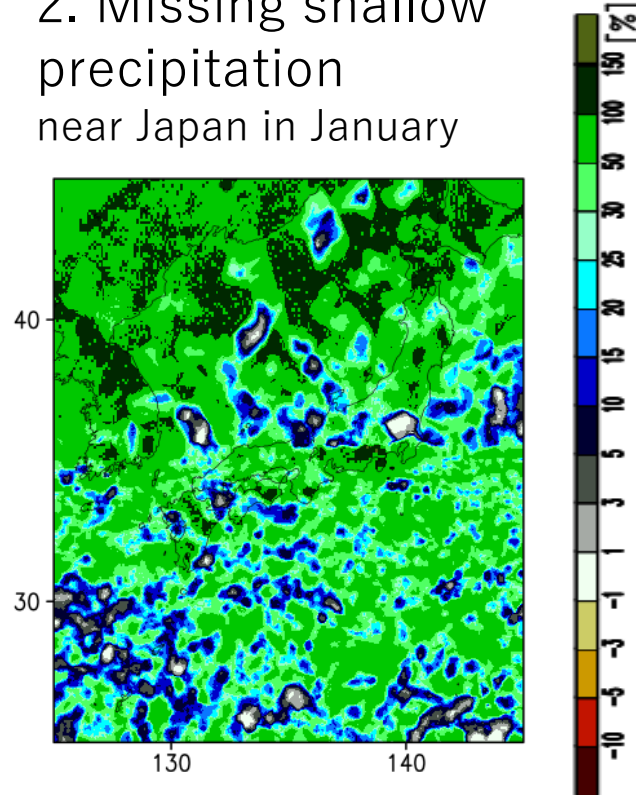
# Towards better extraction of regional characteristics of overland precipitation

Understanding what is not captured, taking into account sensitivity, observable altitude and sampling conditions, is necessary to bridge gaps between observations (Terao et al. 2023, *BAMS*).

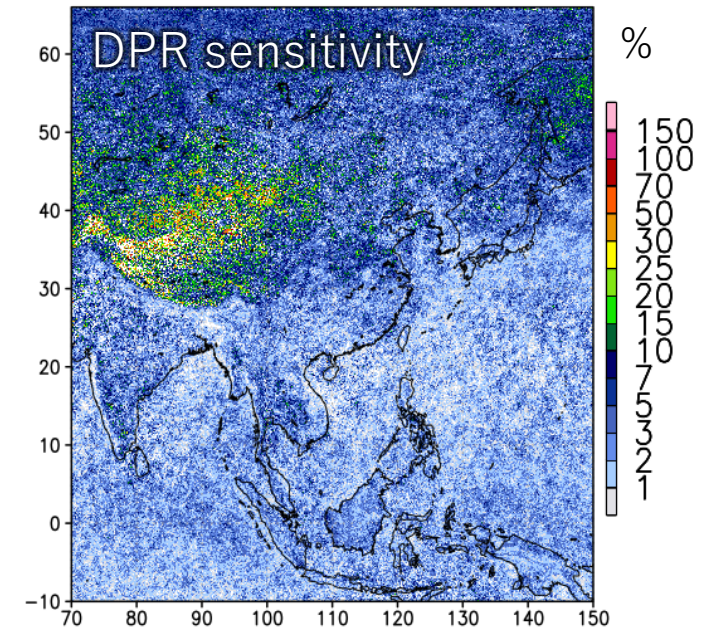
## 1. Effect of LPP correction



## 2. Missing shallow precipitation near Japan in January



## 3. Missing precipitation below sensitivity



In mountainous areas, the effect of corrections for the blind zone are often several tens of % or more.