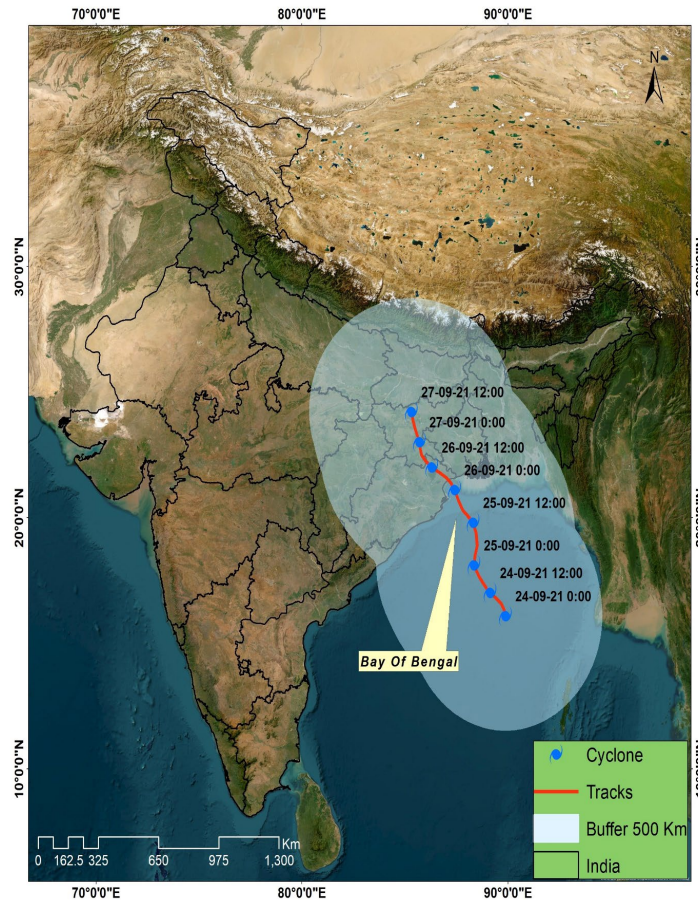


Quantifying Temporal Sampling Error for Gulab Cyclone using GPM Constellation

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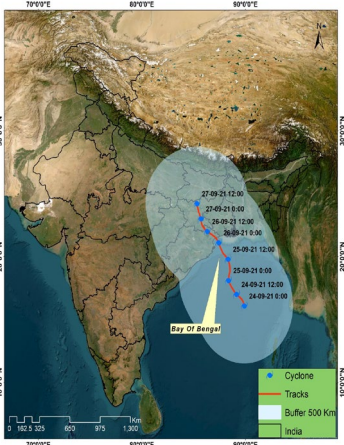


Study Area

	Temporal Resolution	Spatial Resolution	Frequency (GHz)
GPM-GMI	1.5 Hours	13 x 13 Km	10.7 - 183.31
F18-SSMIS	1.5 Hours	12 x 12 Km	19.35- 183.31
MetOpC-MHS	1.5 Hours	17 x 17 Km	89.0- 183.31
NOAA20-ATMS	1.5 Hours	17 x 17 Km	23.0- 183.31
GCOMW1-AMSR2	1.5 Hours	10 x 10 Km	6.7-89.0

*IMERG derived precipitation is also used.

Methodology



- $Sampling\ Error\ (SE) = \frac{RMS}{R} * 100$
- $Root\ Mean\ Square\ (RMS) = \sqrt{(Rs - Rt)^2}$
- $R = Mean\ of\ Rt$
- This can be performed over Various spatial space, Time scale and True rainfall rate.

True Rain Rate (R_t) is total rainfall measured by IMERG during specified time interval

Step 2
Determination of True Rain Rate (R_t) using IMERG data (in mm) over the time interval $[t_1, t_2]$

Step 1
Cyclone track with 500 Km buffer

IMERG (between t_1-t_2)

IMERG (between t_1-t_2)

Sampling Error

Step 4

- $Sampling\ Error\ (SE) = \frac{RMS}{R} * 100$
- $Root\ Mean\ Square\ (RMS) = \sqrt{(Rs - Rt)^2}$
- $R = Mean\ of\ Rt$
- This can be performed over Various spatial space, Time scale and True rainfall rate.

Satellite derived Rain Rate (R_s) is total rainfall measured by the union of all over pass sensor for the given interval of time

Step 3
Determination of satellite derived Rain Rate (R_s) (mm) over the time interval $[t_1, t_2]$

Swath (GMI between t_1-t_2)

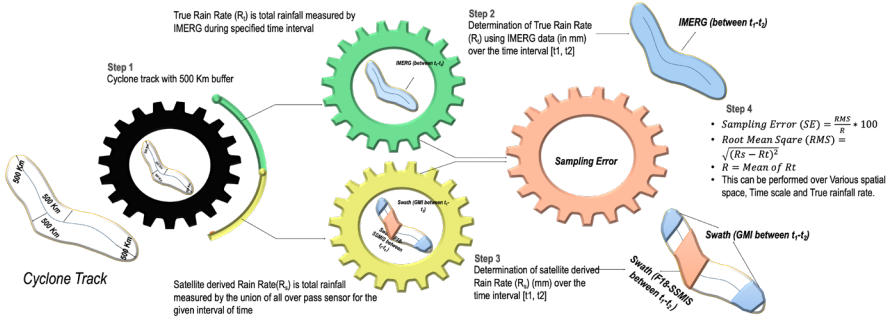
Swath (F18-SSMIS between t_1-t_2)

Swath (GMI between t_1-t_2)

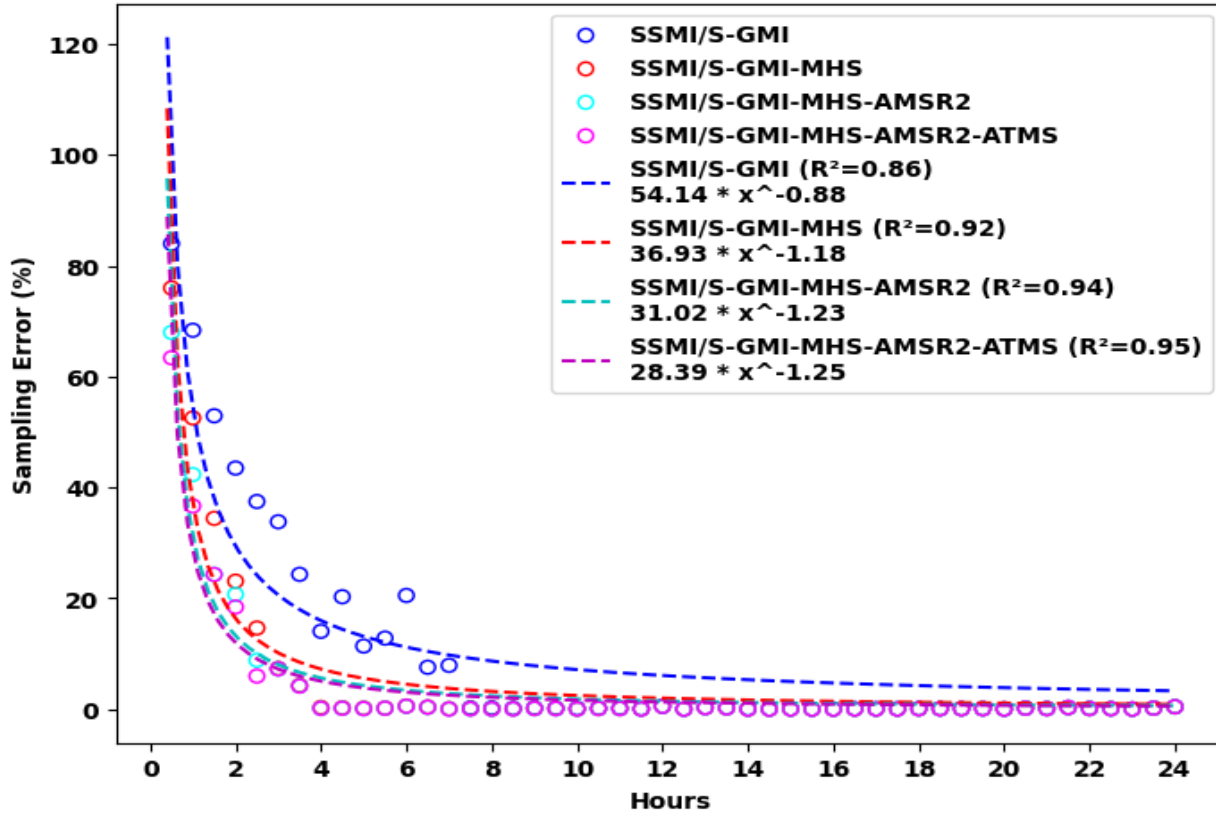
Swath (F18-SSMIS between t_1-t_2)

Cyclone Track

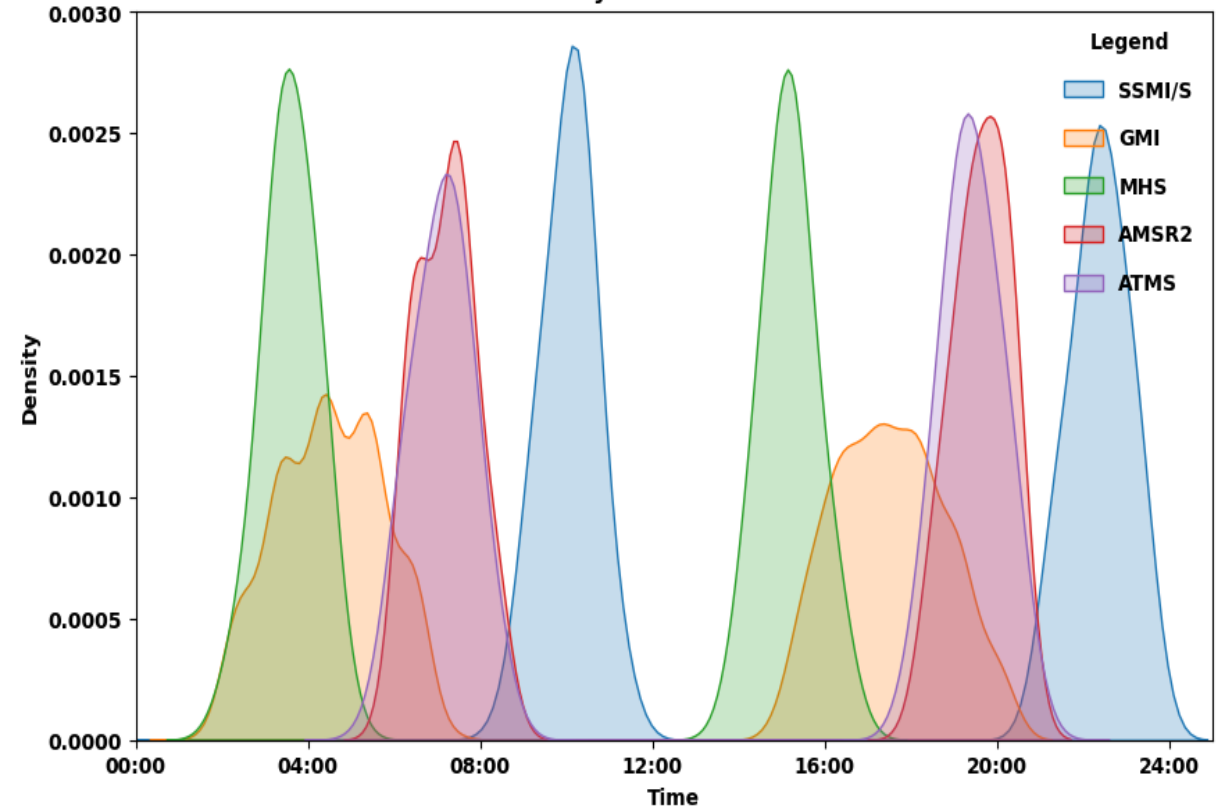
Results



Sampling Error (Gulab Cyclone)



Kernel Density Estimation of Time Data



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