INPE Algorithm for Tracking Precipitating Systems

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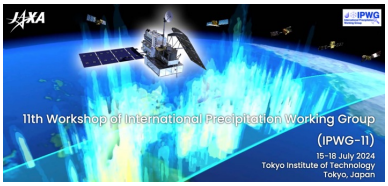
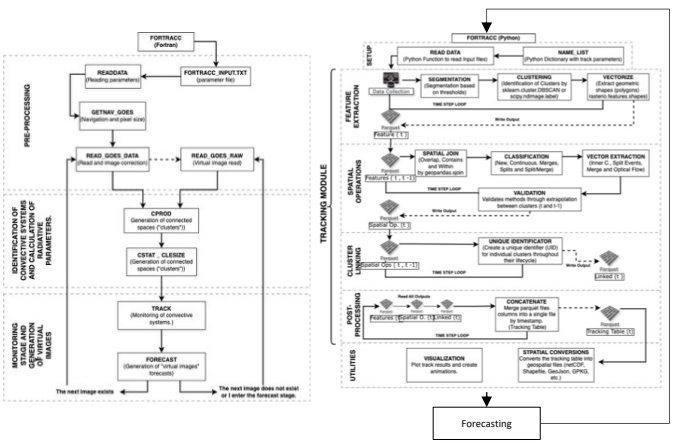


ForTraCC to pyForTraCC

Forecasting and **Tra**cking the Evolution of **C**loud **C**lusters is algorithm developed by (**ForTraCC**; Vila et al, 1998) was originally created to track mesoscale convective systems and nowcast these events using parameters like brightness temperature thresholds, size, and overlap. Its sophisticated design allows for easy data integration, making it popular among scientists and operational centers. However, due to modernization in the programming language and the application of AI techniques, a new algorithm called **pyForTraCC** was developed.

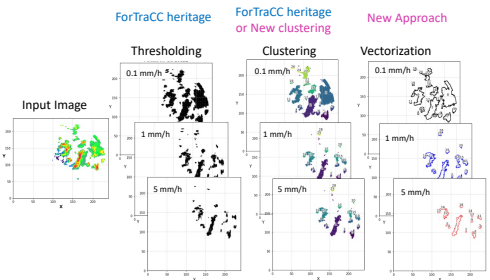
A **py**thon **For**ecasting and **Tra**cking the Evolution of **C**onfigurable **C**lusters

"**Configurable**" instead of "**Cloud**": The term "configurable" implies that the clusters being tracked can be adjusted or modified according to specific configurations or parameters. This indicates flexibility in how the clusters are defined and monitored, allowing for customization based on varying criteria or user preferences.

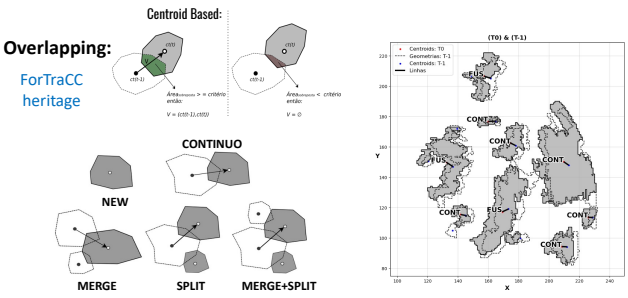


Improvements

Multiple Thresholds and Clustering Methods and Cluster Vectorization

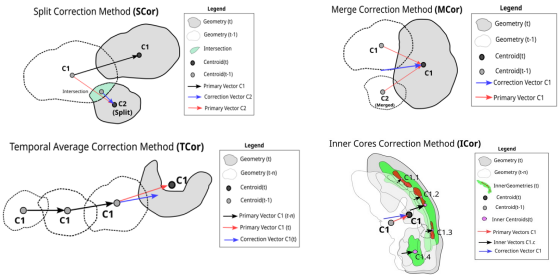


New overlapping approaches and no-code setting of parameters



Improvements (Cont.)

Several methods to corrected the the displacement vector



Automatically choosing (by evaluation) the best method to corrected the vector for each system during their life cycle

POD: It is the ratio between the number of correctly predicted events and, the number of observed events.

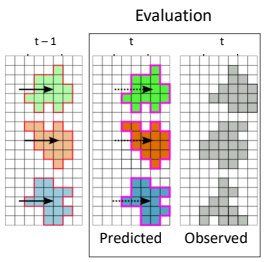
POD = *Hit / (Hit + Miss)*

FAR: A measure of the frequency of occurrence of false alarms in a reference context.

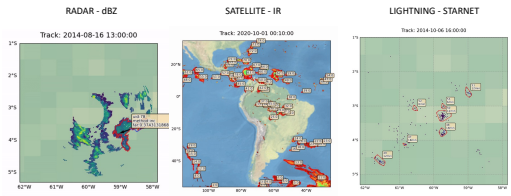
FAR = *Hit / (Hit + False Alarm)*

CSI: Measures the fraction of observed and/or forecast events that were correctly predicted.

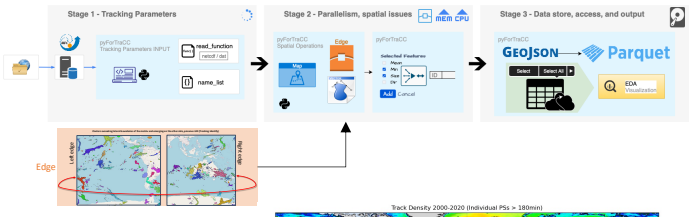
***CSI** = Hit / (Hit + Miss + False Alarm)*



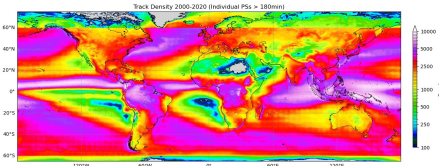
Flexible: Multiple objects can be tracking and forecasting



Optimization to deal with big data



Example: GSMaP (JAXA) precipitating events tracked during to 20 years



Contact

The code and documentation will be release soon. Any collaboration, please, contact alan.calheiros@inpe.br

ACKNOWLEDGEMENTS

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