

An Ancillary Rain Accumulation Data Product to Assess the Effects of Rain on the Remote Sensing of Sea Surface Salinity



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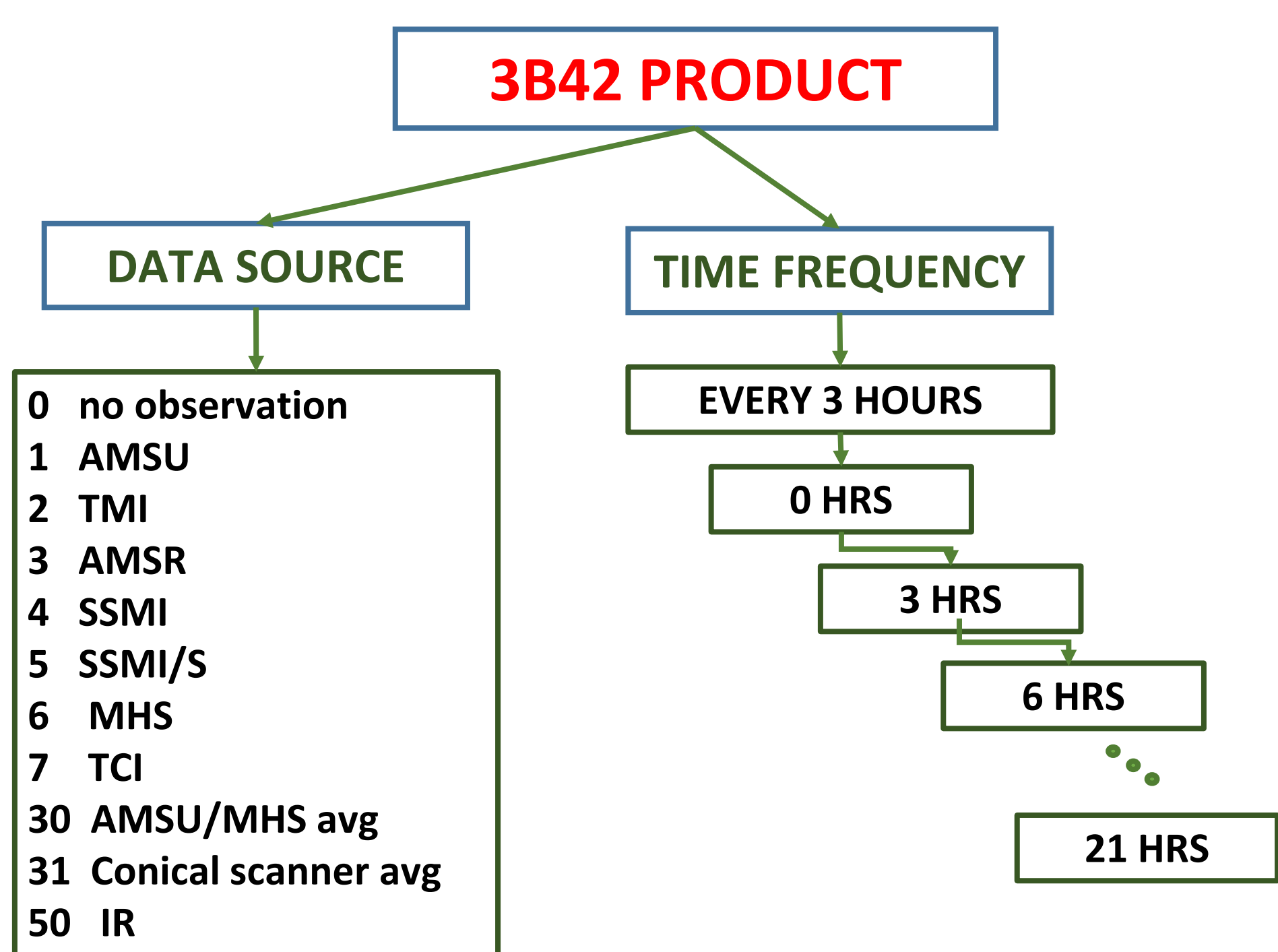


Abstract

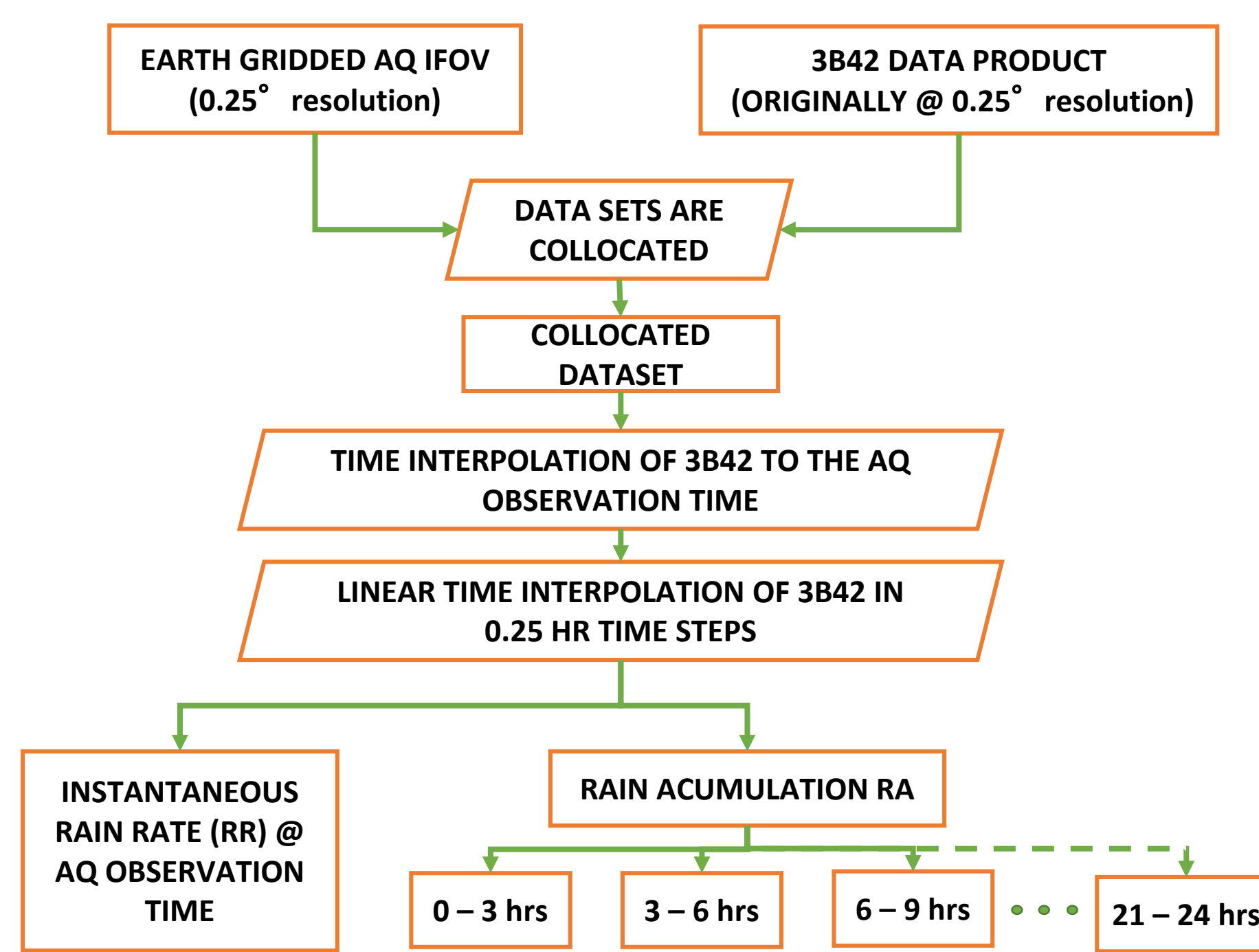
To date, both AQ and SMOS missions have observed significant differences between L-band SSS retrievals in presence of rain and surface truth (buoys and HYCOM model). Based upon pre-launch analyses of rain effects, this is an unexpected result, which begs the question "Is it retrieval error or science?" In an attempt to resolve this issue, an AQ Rain Accumulation product has been developed to overlaps the Aquarius L2-SSS data. It is derived from the Tropical Rainfall Measuring Mission (TRMM) 3B42 product, which is a near-global, gridded rain rate dataset that extends from $\pm 50^\circ$ latitude and is produced 8 times daily at 0Z, 3Z, 6Z . . . and 21Z (3-hr windows). Based upon the AQ pixel observation time, these 3B42 data are temporally interpolated in 3-hr windows and spatially averaged over each AQ IFOV to produce a rainfall history during the previous 24hrs. A beta version of this ancillary rainfall product is available to the AQ science team at JPL PODAAC.

The purpose of this paper is to describe this AQ Rain Accumulation product and to present validation results using independent WindSat rain retrievals (EDR) that occur within ± 45 minutes for $\sim 60\%$ of the AQ L2 science data pixels.

AQ RAIN ACCUMULATION – SOURCE DATA



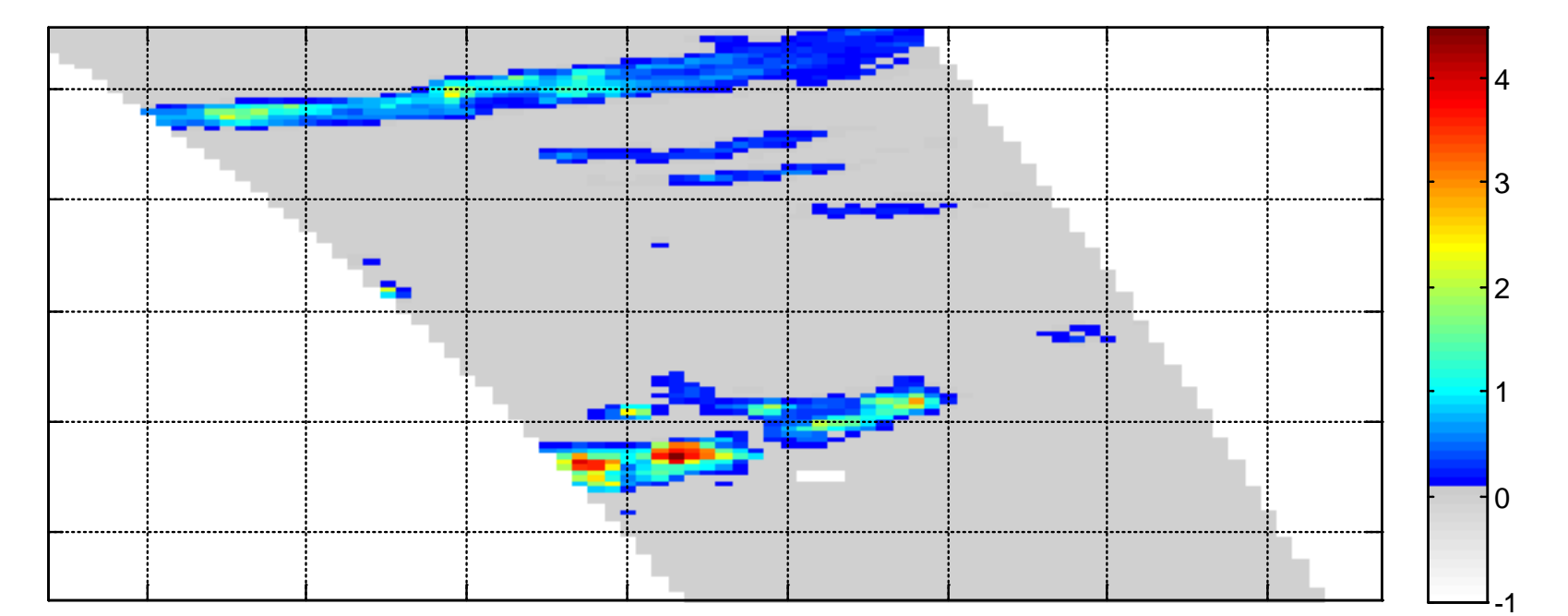
AQ RAIN ACCUMULATION ALGORITHM



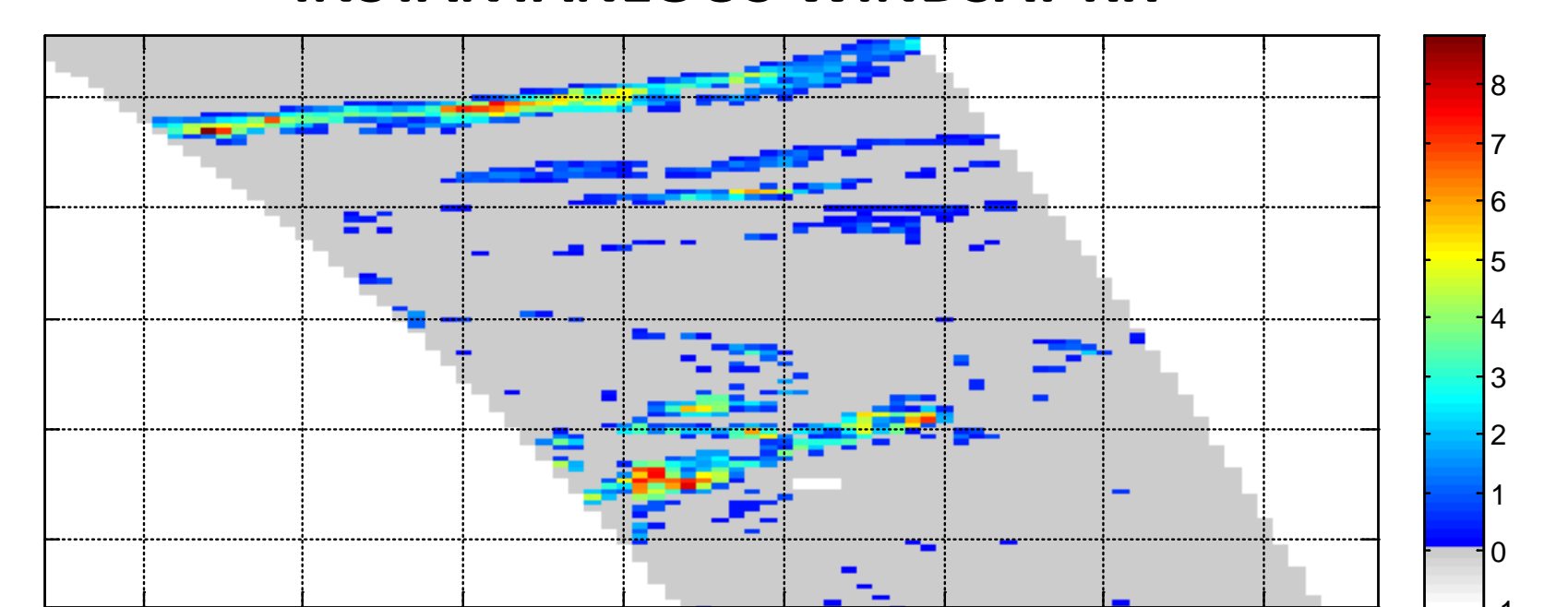
AQ RAIN ACCUMULATION VALIDATION

- The validation has been conducted using EDR WindSat data.
- 3B42 data was interpolated to WindSat time using same methodology than the AQ RA product.
- Verification of the rain events were completed using visual comparison and normalized cross correlation

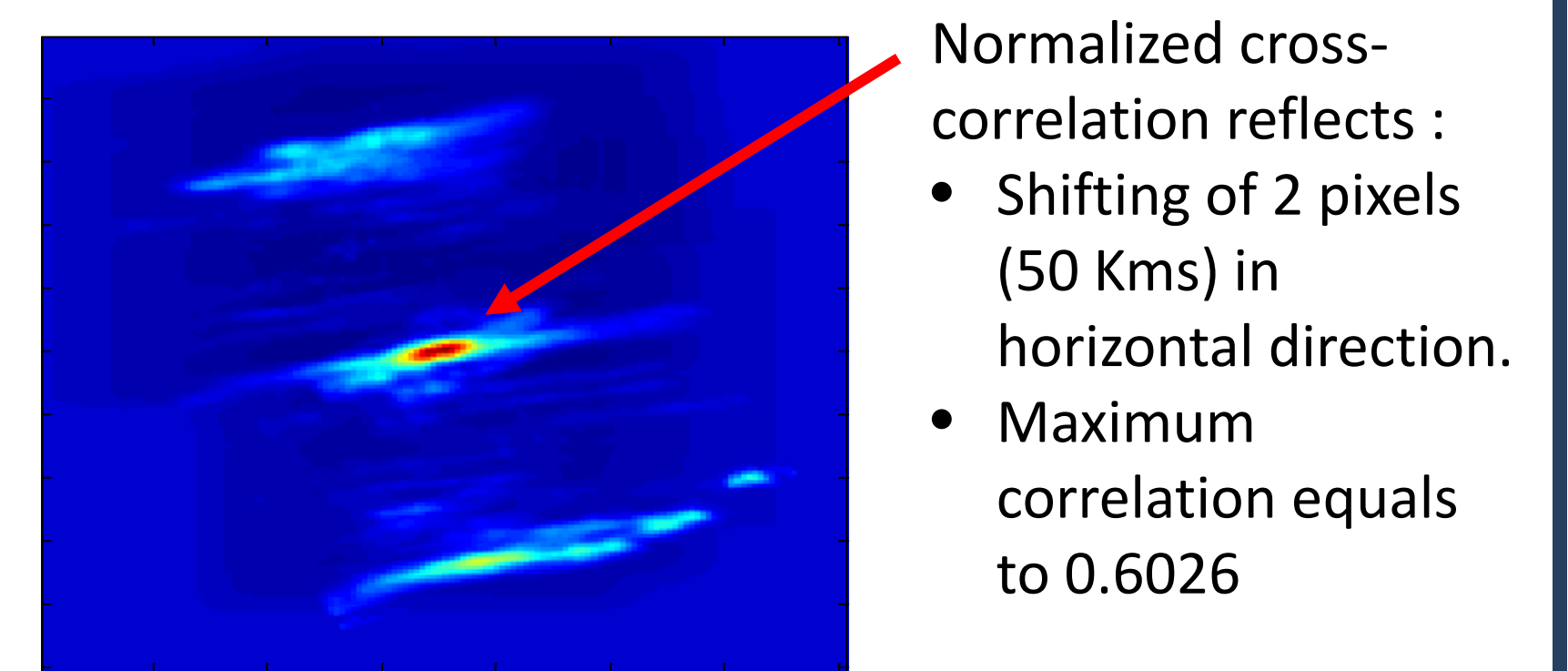
INSTANTANEOUS 3B42 RR INTERPOLATED TO WINDSAT TIME



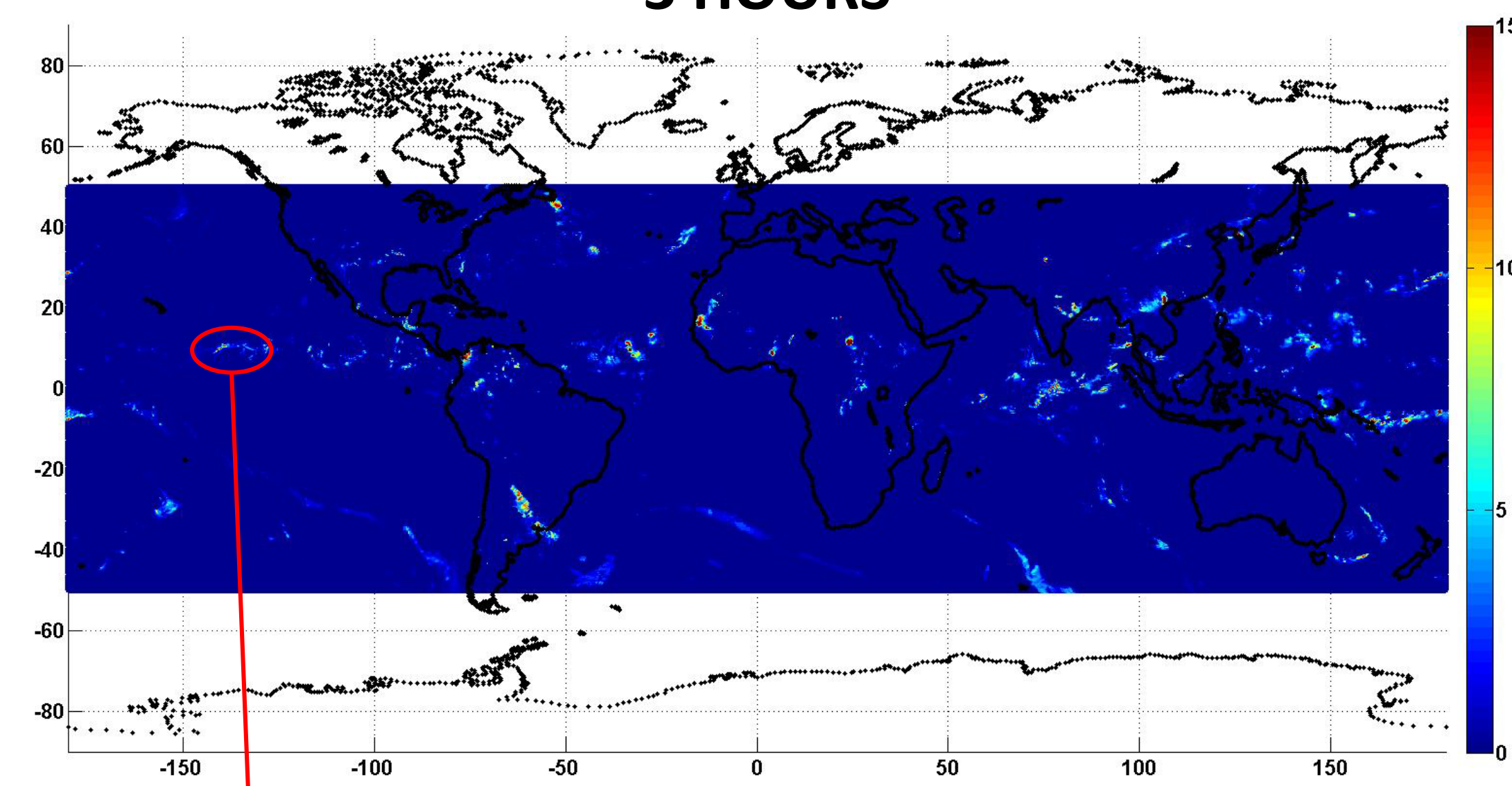
INSTANTANEOUS WINDSAT RR



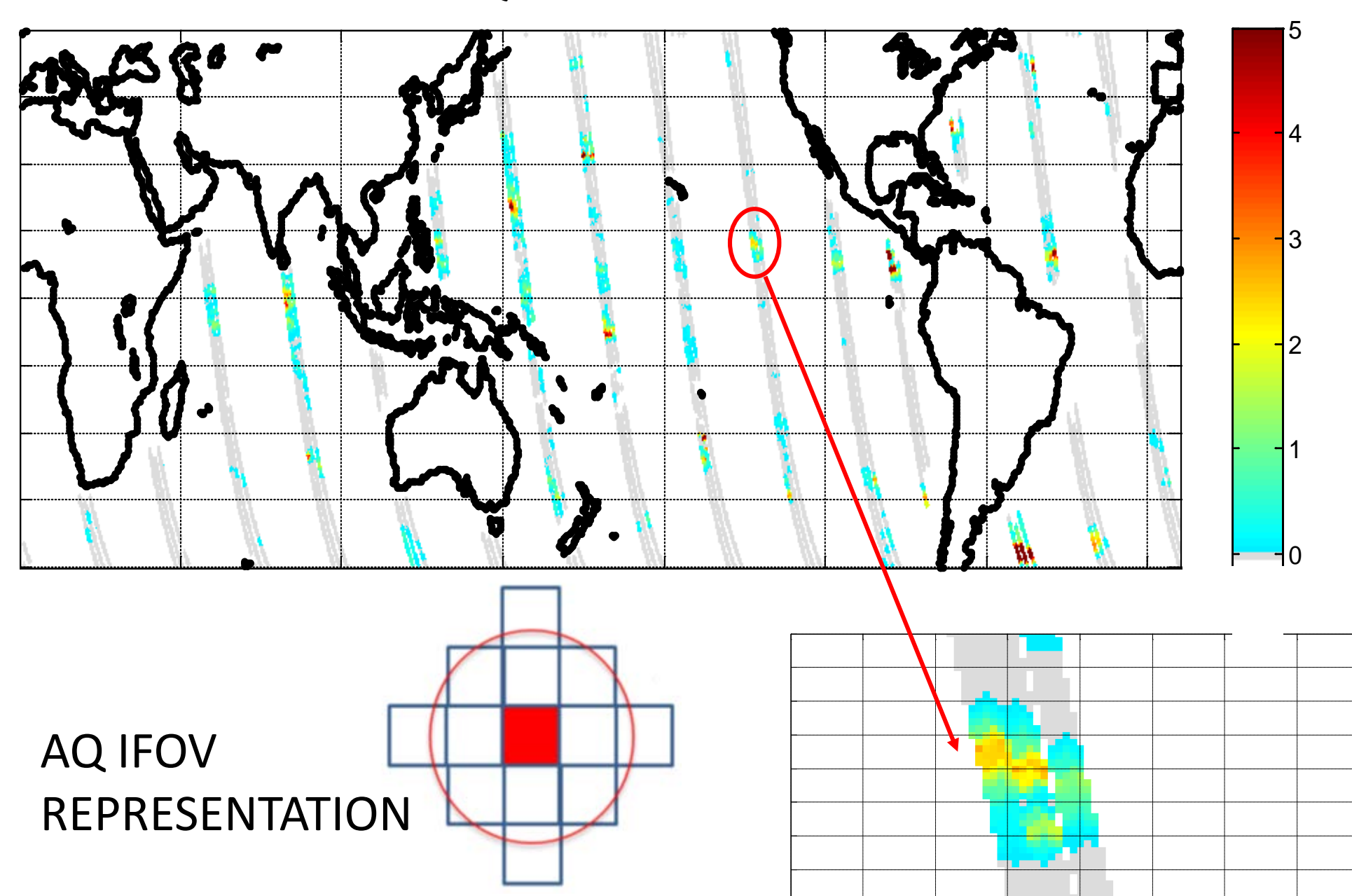
NORMALIZED CROSS CORRELATION MATRIX



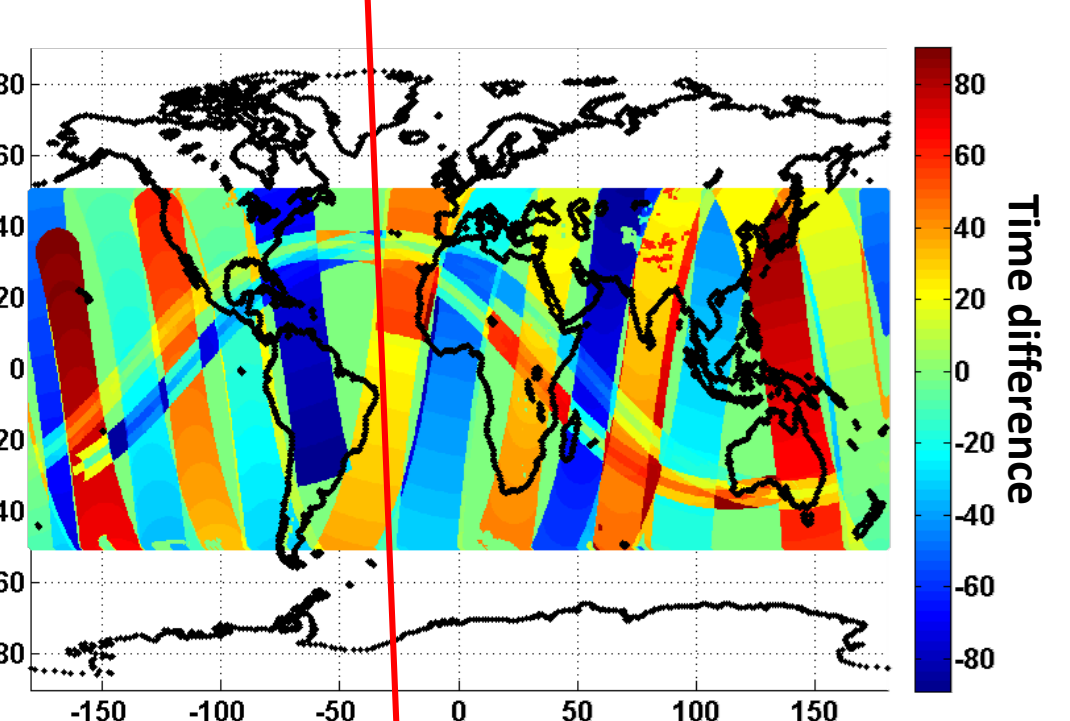
INSTANTANEOUS RAIN RATE FROM 3B42 @ 3 HOURS



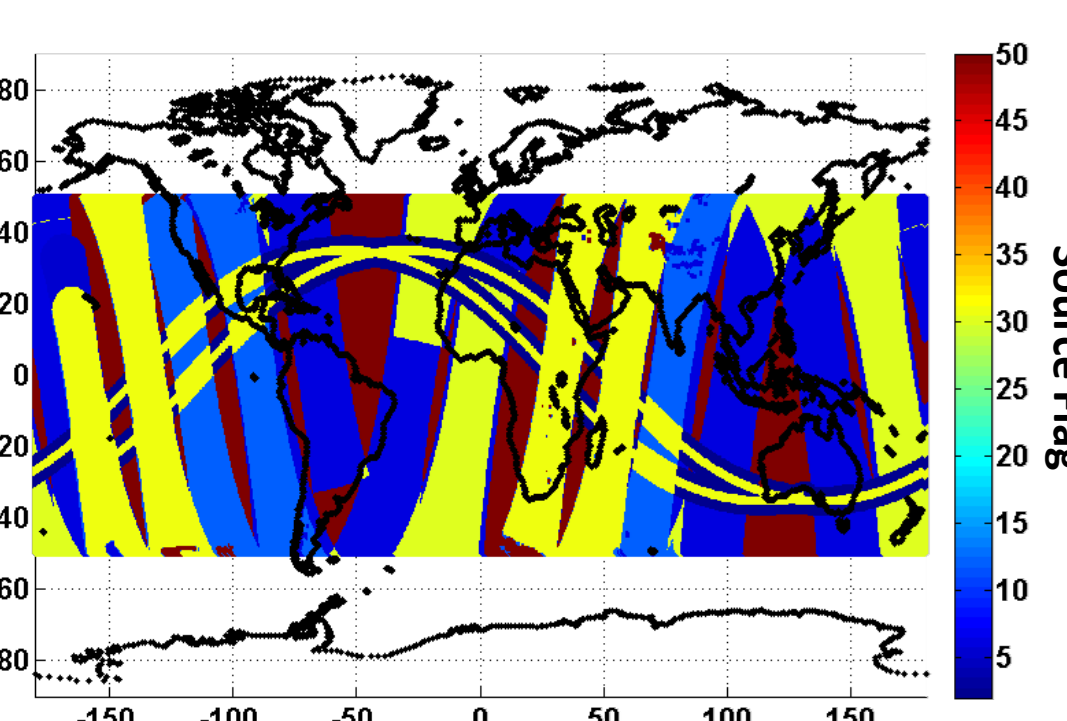
INSTANTANEOUS RAIN RATE OVER AQ FOOT PRINT



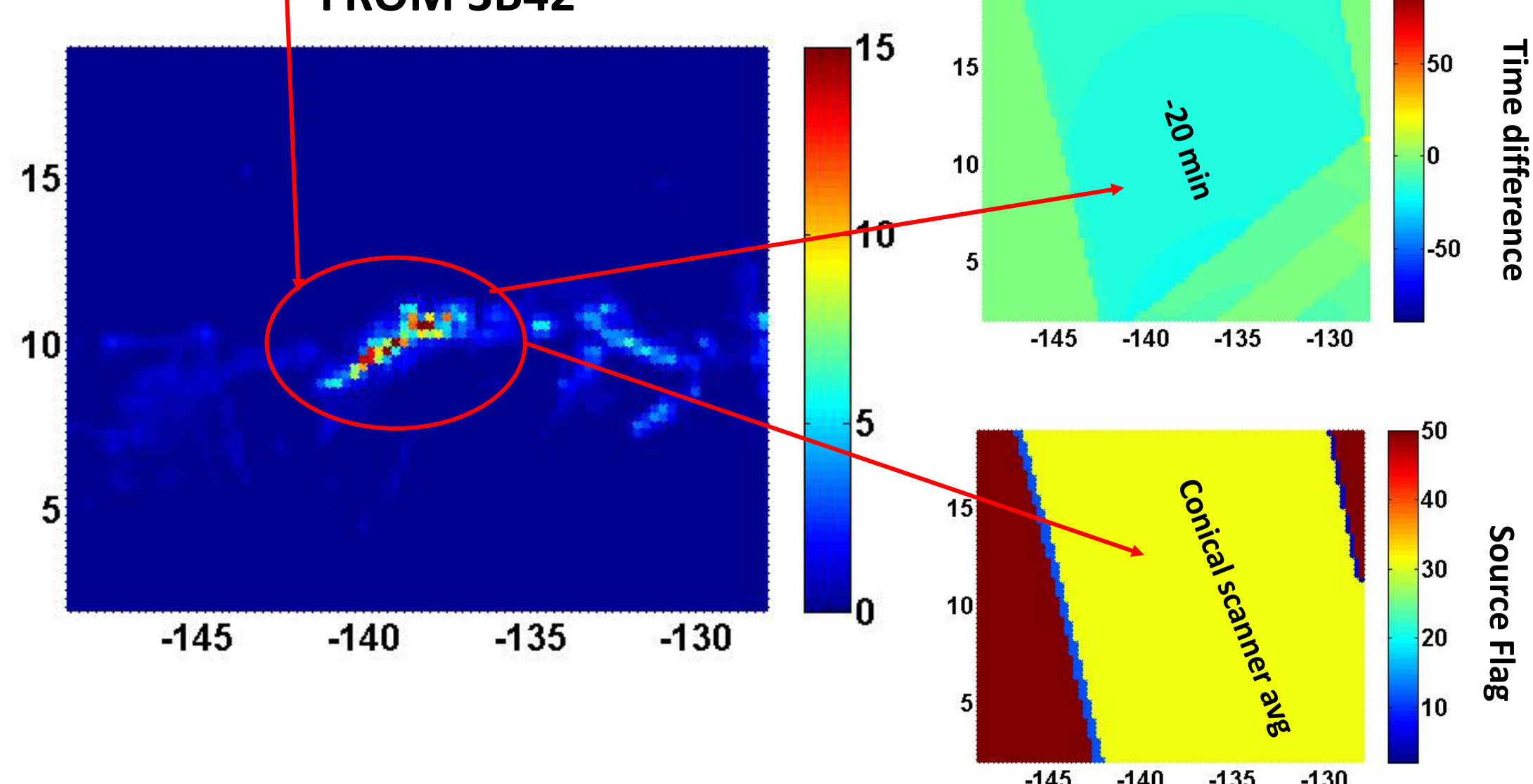
TIME DIFFERENCE TO THE CENTER OF THE TIME WINDOW



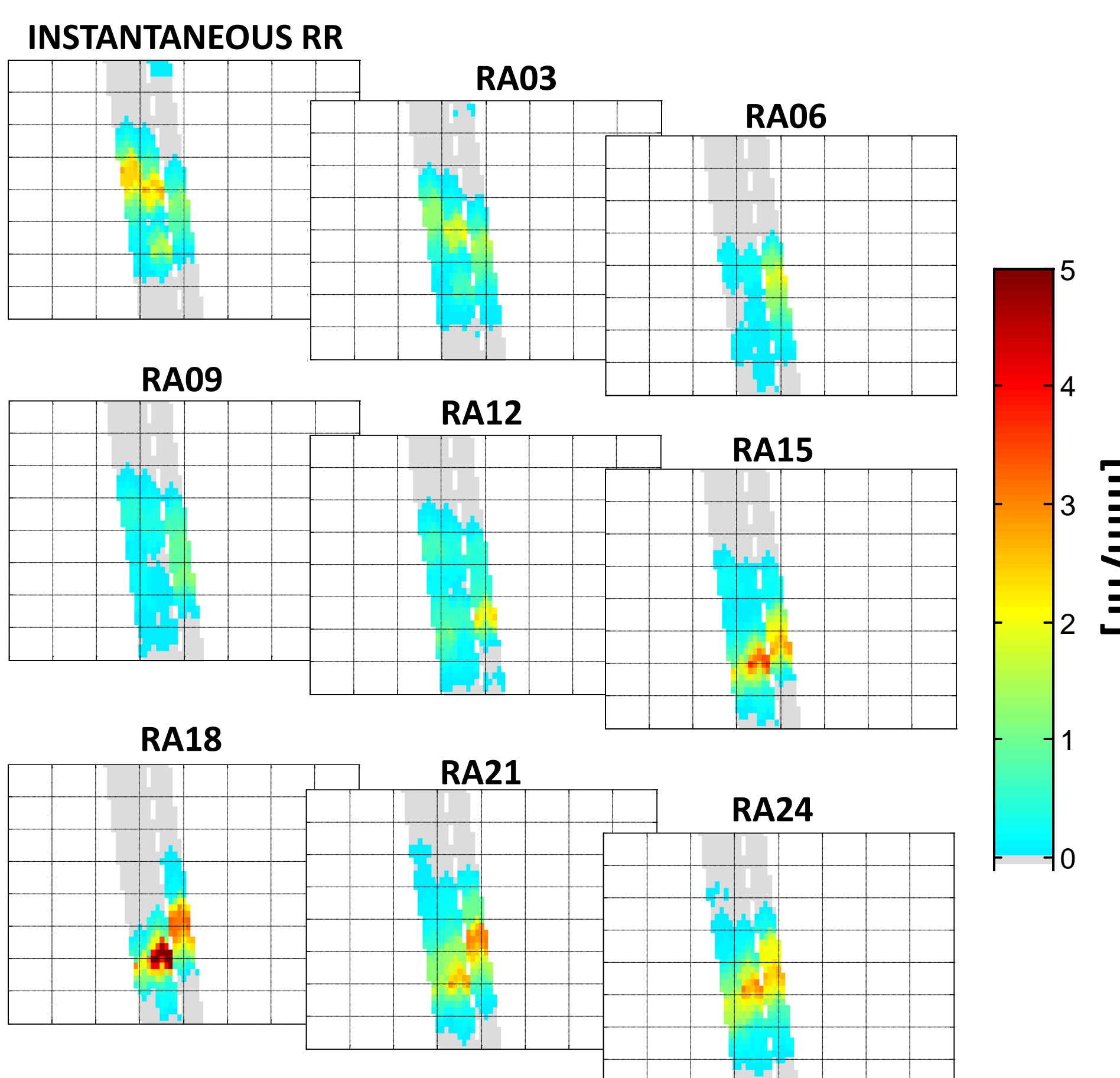
DATA SOURCE



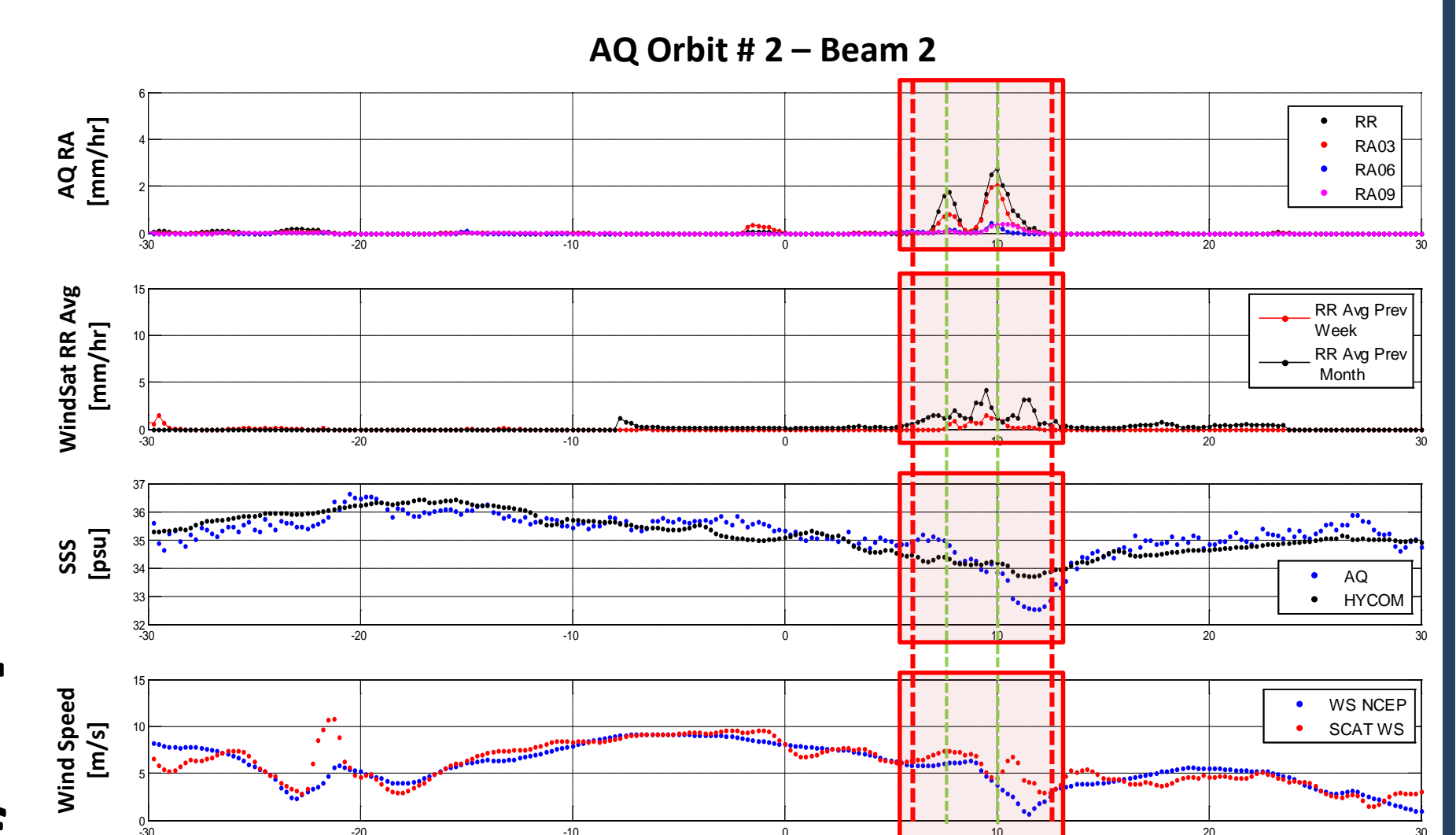
INSTANTANEOUS RAIN RATE FROM 3B42



RAIN ACCUMULATION PRODUCT OVER PREVIOUS 24 HOURS TO AQ TIME



RAIN EVENT – AUG 18/2012



CONCLUSIONS

Validation performed using the well-calibrated WindSat EDR data ensures reliability to the AQ RA product. AQ RA product is a useful source of ancillary data that permits more comprehensive analysis of the rain effect on the measurement of sea surface salinity. An improved version of the AQ RA product is under development to increase the accuracy of time of precipitation occurrence.