Geophysical Research Abstracts
Vol. 13, EGU2011-2659, 2011
EGU General Assembly 2011

Probabilistic Interpolation of Multiplatform Microwave Satellite Rainfall Estimates

Tim Bellerby
University of Hull, Geography, Hull, United Kingdom (t.j.bellerby@hull.ac.uk)

This paper will present a new methodology for deriving high-resolution rainfall information from multiple low Earth orbiting platforms. The technique derives conditional rainfall probability distributions describing both expected rainfall and its associated uncertainty at locations and times between satellite sensor overpasses. This information is derived using the combination of a discrete probabilistic nowcasting model operating along rainfall advection streamlines and a novel probability-matching technique for deriving the most likely paths for those streamlines.

The probability-based template-matching approach determines the most likely paths taken by precipitating systems by optimising the performance of the nowcasting model. This proves to be significantly more robust and flexible than feature-oriented tracking approaches previously presented. The nowcasting model is run both forward and backwards along the derived streamlines, effectively interpolating between sensor overpasses. A 'bootstapping' approach, in which the nowcasting model is recalibrated after streamline optimisation and the whole streamline-optimisation/recalibration process repeated a number of times, is used to ensure the reliability of the resulting conditional distributions.

The technique has been implemented over the continental United States. In addition to yielding information on rainfall patterns, this new product provides a powerful tool to assess the potential information available from multiple satellite sensors as a function of location and time.