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Rainfall retrievals in mid-latitudes: initial analyses from the IPWG European validation site

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The derivation of precipitation from satellites for meteorological and climatological applications is now common practice. Spurred on by a series of intercomparison studies of satellite rainfall estimates, a number of 'standard' rainfall products are now available to the wider community for use at various temporal and spatial resolutions. Much of the success of satellite algorithms rely upon the statistical analysis of bulk values: results are often generated on climatological scales such as monthly, 2.5x2.5 degrees. Analyses of these products indicate that algorithms can usefully retrieve rainfall information which is of particular value in regions where little or no surface observations exist. More recently, finer resolution products are being generated resulting an increase in the resolution to as little as the 30 minute, $1/10^{th}$ degree scales. Due to the nature of rainfall, the statistical results from these algorithms are typically poorer than those derived from the coarser scale resolution results, but nevertheless provide an important step towards finer scale observations. However, some critical issues still exist.

Three international validation sites have been established to investigate the properties of these 'standard' products. Organised through the International Precipitation Work-

ing Group these sites are located in Australia, the United States and Europe. These sites collect satellite estimates derived from operational and quasi-operational sources for comparison, in very near real time, with surface data derived from rain gauges and radar. In addition to the generation of daily statistics for each product, time series analyses are starting.

The paper presents some of the initial findings for the European region. One of the most significant artefacts found is that of seasonal biases in some of the standard product rainfall totals. Furthermore, seasonal biases also affect the delineation of rainfall as well as indicating that algorithms tend to produce relatively bias-free rainfall totals over larger spatial and temporal domains, the occurrence of rainfall is often poorly represented. Algorithms tend to bias-corrected in the long-term by comparison against monthly gauge data. However, if these algorithms fail to correctly retrieve light precipitation it means that the medium and heavy rainfall must be over-estimated. This therefore has implications in terms of the accurate retrieval of rainfall intensities and in monitoring climatological changes in rainfall regimes.