

Retrieving Rainfall Rates from ERS Altimetric data

Graham
Quartly Remote Sensing Applications Development Unit (RSADU), Southampton Oceanography Centre, Southampton,
Hants, SO14 3ZH, UK
phone: +44-1703-596412, fax: +44-1703-596400
email: gdq.soc.soton.ac.uk
URL: <http://www.soc.soton.ac.uk/RSADU>

Abstract

Attenuation by rain has long been known to affect the quality of altimetric returns from a sea surface, its effect being manifest not only in the overall power level, σ_0 , but also in the distortion of the waveforms from a "Brown-like" return. Any particular rain feature will trace out a parabolic path in the waveform data, as the sub-satellite point approaches and recedes from it. Using simulations, an algorithm has been developed whereby the degree of attenuation (and hence the rainfall rate) can be estimated at each location, without the estimate being biased by attenuation in neighbouring areas.

The technique is explained, and estimates given of the accuracy achievable. The algorithm is then applied to ERS WAP (waveform product) data obtained from the UK-PAF. Some cross-track information is derivable, although a left-right ambiguity can not be resolved from the altimeter data alone. Nevertheless, this technique offers the opportunity to examine rainfall structure in regions not easily covered by aircraft or ground-based radar.

Keywords: Rain estimation, ERS altimetry, WAP (waveform) analysis