

# Future Directions for Satellite Studies of Skin-Bulk Temperature Differences

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## Abstract

It is now becoming widely accepted that satellite infrared instruments actually measure the skin temperature of the ocean surface rather than the bulk temperature as measured by in-situ devices mounted on ships and buoys. Traditional fields of satellite-derived SST have been supplied through the long-term series of AVHRR instruments either as MCSST or as a product of the joint NASA-NOAA Pathfinder Project. Algorithm coefficients have been derived using regression analyses with coincident satellite and in-situ measurements of bulk-SST. Thus the difference between the skin (as measured by the AVHRR) and the bulk (in-situ) temperatures has been inherently included in the AVHRR SST algorithms. In contrast data from the ATSR instruments on the ERS-1 and ERS-2 satellites have been analysed using theoretically derived SST algorithms and thus provide a direct measure of the skin temperature. Precise validation of the ATSR SST product has only been possible with the use of surface- or airborne-based infrared radiometers. Before numerical modellers will be convinced of the need to use skin (radiative) temperatures rather than bulk temperatures in air-sea interaction processes it is crucial that a globally robust relation or parameterisation between the two "sea surface temperatures" is obtained. This paper will suggest and explore the future directions of investigations that are needed to provide such a relation.