

## THE BUOYANT EQUIPMENT FOR SKIN TEMPERATURE (BEST), A NEW INSTRUMENT FOR IN-SITU VALIDATION OF SATELLITE RETRIEVED SEA SURFACE TEMPERATURE

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The satellite measured SST is more closely related to the skin temperature than the subsurface bulk temperature. It is not convictive to validate the satellite measured SST with the subsurface bulk temperature, which is generally measured at a depth of one meter or even deeper. In order to validate the satellite retrieved SST, it is necessary to measure skin temperature.

In this poster, The Buoyant Equipment for Skin Temperature (BEST), a new instrument for skin temperature measurement, is described. The simple version of the BEST has only one sensor pole. The thermistor sensors are arrayed from 0.6 mm in the top part of the pole (with length of 50 cm) to 10 mm in the bottom part of the pole. The pole is vertically floated in the sea surface layer, and it can synchronically measure the temperatures of the bottom layer of the air, the skin layer and the surface layer of the water every second. The measured data are saved in a SD card. And the BEST could continuously work for one week depending on mainly the battery. The measured temperatures can be recorded every second at an accuracy of 0.05K.

The standard version of the BEST will have at least 3 sensor poles which vertically located at

regular triangle vertexes with distance of 100mm. The standard version can measure the temperatures of three profiles of air-sea boundary layer in the triangle prism. The skin temperature of the small water plane in the regular triangle could be measured. The measured planar skin temperature could be used as reference temperature for in-situ calibration of a sensitive thermal camera. In this way the calibration of temperature measurement could be transferred from the laboratory to the ocean. The accuracy of thermal camera could be significantly improved from 1K to about 0.1K. Then the calibrated thermal camera could be used for fast collection of skin temperature of large area of waters. The new method will greatly increase the spatial matching between the in-situ data and satellite data by fast measurement of skin SST of an area instead of a point. It will significantly improve the reliability of in-situ calibration of satellite retrieved SST. The standards version of BEST will be available in August 2016. Some in-situ measurement data collected in the Pearl River estuary with simplified version of BEST is presented. Keywords: Sea surface temperature, skin temperature, In-situ validation, Instrument.





Figure 1. The first version of BEST (with 0.9 mm resolution)

Figure 2. The Shorted Simple version of BEST (with 0.6 mm resolution)



Figure 3. A sensor pole for standard version of BEST (with 0.6 mm resolution)



Figure 4. Photo of In-situ experiment in the Pearl River Estuary with the shorted Simple version of BEST



Figure 5. The temperature profile measured with the shorted Simple version of BEST in the Pearl River Estuary at 12:03, Nov.29,2015



Figure 6. The patent certificate: An Equipment for Synchronously Measurement of Skin SST and Bulk SST and A method for Calibration of Satellite Thermal Remote Sensing.