**The Radiometric Processing Software (RPS) tool: Algorithm, data protocol and merging for hyperspectral free falling radiometers**

Violeta Sanjuan Calzado1, David McKee2, Charles Trees1

**Abstract** : A data processing protocol and a software is presented for hyperspectral radiometric data from free-falling profiling systems whose acquisition can be strongly affected by surface perturbations (Zaneveld et al., 2001, D'Alimonte et al., 2010). The presented data processing protocol focuses on 1) the minimization of high frequency fluctuations on the incident radiant field with data filtering and normalization techniques and 2) reduction of wave-induced uncertainties with best fit radiometric data in the surface layer of the water column.

Processing methodologies are presented for data acquired in single cast mode, long deep radiometric profiles, and multi cast mode, consisting on a series of short shallow consecutive profiles for best radiometric data in the top layer of the water column (Zibordi et al., 2004) by increasing the depth resolution and data density of the casts. The algorithm presents the possibility of merging single and multi-cast acquisitions when both are available and reasonably coincident in space and time. Merging is performed thought the K-matching technique; using K calculated values from the single cast to estimate rescaled Ed and Lu profiles beneath the multicast depth. This procedure generates full depth radiometric profiles with significant reduction of wave induced uncertainties in the surface layer of the water column, better suited for ecosystem modeling and optical closure studies, as rapid, time dependent fluctuations have been reduced.

1Centre for Maritime Research and Experimentation NATO, La Spezia, Italy

2Department of Physics, University of Strathclyde, Glasgow, Scotland, U.K.

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