



Implementation of the DINEOF ArcGIS Toolbox: Case study of reconstruction of Chlorophyll-a missing data over the Mediterranean using MyOcean satellite data products.

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ArcGIS[®] is a well known standard on Geographical Information Systems, used over the years for various remote sensing procedures. During the last decade, Rixen (2003) and Azcarate (2011) presented the DINEOF (Data Interpolating Empirical Orthogonal Functions) method, a EOF-based technique to reconstruct missing data in satellite images. The recent results of the DINEOF method in various experimental trials (Wang and Liu, 2013; Nikolaidis et al., 2013;2014) showed that this computationally affordable method leads to effective reconstruction of missing data from geophysical fields, such as chlorophyll-a, sea surface temperatures or salinities and geophysical fields derived from satellite data. Implementing the method in a GIS system will lead to a complete and integrated approach, enhancing its applicability. The inclusion of statistical tools within the GIS, will multiply the effectiveness, providing interoperability with other sources in the same application environment. This may be especially useful in studies where various different kinds of data are of interest. For this purpose, in this study we have implemented a new GIS toolbox that aims at automating the usage of the algorithm, incorporating the DINEOF codes provided by GHER (GeoHydrodynamics and Environment Research Group of University of Liege) into the ArcGIS[®]. A case-study of filling the chlorophyll-a missing data in the Mediterranean Sea area, for a 18-day period is analyzed, as an example for the effectiveness and simplicity of the toolbox. More specifically, we focus on chlorophyll-a MODIS satellite data collected by CNR-ISAC (Italian National Research Council, Institute of Atmospheric Sciences and Climate), from the respective products of MyOcean2[®] organization, that provides free online access to Level 3, with 1 km resolution. All the daily products with an initial level of only 27% data coverage were successfully reconstructed over the Mediterranean Sea.

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