Geophysical Research Abstracts
Vol. 19, EGU2017-12851-1, 2017
EGU General Assembly 2017

Downwelling radiation at the sea surface in the central Mediterranean: one year of shortwave and longwave irradiance measurements on the Lampedusa buoy

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An oceanographic buoy has been developed and deployed in August 2015 about 3.3 miles South West of the island of Lampedusa, at 35.49°N, 12.47°E, in the central Mediterranean Sea. The buoy was developed within the Italian RITMARE flagship project, and contributes to the Italian fixed-point oceanographic observation network. The buoy is an elastic beacon type and is intended to study air-sea interactions, propagation of radiation underwater, and oceanographic properties. The buoy measurements complement the atmospheric observations carried out at the long-term Station for Climate Observations on the island of Lampedusa (www.lampedusa.enea.it; 35.52°N, 12.63°E), which is located about 15 km E-NE of the buoy. Underwater instruments and part of the atmospheric sensors are presently being installed on the buoy.
Measurements of downwelling shortwave, SW, and longwave, LW, irradiance, have been made since September 2015 with a Kipp and Zonen CMP21 pyranometer and a Kipp and Zonen CGR4 pyrgeometer, respectively. The radiometers are mounted on a small platform at about 7 m above sea level, on an arm protruding southward of the buoy. High time resolution data, at 1 Hz, have been acquired since December 2015, together with the sensors' attitude.
Data from the period December 2015-December 2016 are analyzed and compared with measurements made on land at the Station for Climate Observations at 50 m above mean sea level. This study aims at deriving high quality determinations of the downwelling radiation over sea in the central Mediterranean. The following aspects will be discussed:
- representativeness of time averaging of irradiance measurements over moving platforms;
- comparison of downwelling irradiance measurements made over land and over ocean, and identification of possible correction strategies to infer irradiances over the ocean from close by measurements made over land;
- influence of dome cleaning on the quality of measurements;
- envisaging possible corrections strategies for varying radiometers' attitude.