Geophysical Research Abstracts
Vol. 18, EGU2016-3262, 2016
EGU General Assembly 2016
© Author(s) 2016. CC Attribution 3.0 License.

Projected Changes on the Global Surface Wave Drift Climate towards the END of the Twenty-First Century

Ana Carrasco (1), Alvaro Semedo (2,3), Arno Behrens (4), Ralf Weisse (4), Øyvind Breivik (1), Øyvind Saetra (1), and Kai Håkon Christensen (1)

(1) (anac@met.no) (1) Norwegian Meteorological Institute, Oslo, Norway, (2) (2) Escola Naval-CINAV, Lisbon, Portugal, (3) (3) nstituto Dom Luiz, University of Lisbon, Lisbon, Portugal, (4) (4) Helmholtz-Zentrum Geesthacht Centre for Materials and Coastal Research, Geesthacht, Germany

The global wave-induced current (the Stokes Drift – SD) is an important feature of the ocean surface, with mean values close to 10 cm/s along the extra-tropical storm tracks in both hemispheres. Besides the horizontal displacement of large volumes of water the SD also plays an important role in the ocean mix-layer turbulence structure, particularly in stormy or high wind speed areas. The role of the wave-induced currents in the ocean mix-layer and in the sea surface temperature (SST) is currently a hot topic of air-sea interaction research, from forecast to climate ranges. The SD is mostly driven by wind sea waves and highly sensitive to changes in the overlaying wind speed and direction.
The impact of climate change in the global wave-induced current climate will be presented. The wave model WAM has been forced by the global climate model (GCM) ECHAM5 wind speed (at 10 m height) and ice, for present-day and potential future climate conditions towards the end of the end of the twenty-first century, represented by the Intergovernmental Panel for Climate Change (IPCC) CMIP3 (Coupled Model Inter-comparison Project phase 3) A1B greenhouse gas emission scenario (usually referred to as a “medium–high emissions” scenario). Several wave parameters were stored as output in the WAM model simulations, including the wave spectra. The 6 hourly and $0.5^{o}\times0.5^{o}$, temporal and space resolution, wave spectra were used to compute the SD global climate of two 32-yr periods, representative of the end of the twentieth (1959–1990) and twenty-first (1969–2100) centuries. Comparisons of the present climate run with the ECMWF (European Centre for Medium-Range Weather Forecasts) ERA-40 reanalysis are used to assess the capability of the WAM-ECHAM5 runs to produce realistic SD results. This study is part of the WRCP-JCOMM COWCLIP (Coordinated Ocean Wave Climate Project) effort.