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Exploring the influence of surface waves in the carbon dioxide transfer velocity between the ocean and atmosphere in the coastal region

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Field measurements have been carried out in order to better understand the possible influence of ocean surface waves in the transfer of carbon dioxide between the ocean and atmosphere in the coastal zone. The CO_2 fluxes are being analysed and results are shown in a contribution by Gutiérrez-Loza et al., in this session. Here we try to highlight the findings regarding the transfer velocity (kCO_2) once we have incorporated direct measurements of carbon dioxide concentration in the water side. In this study direct measurements of CO_2 fluxes were obtained with an eddy covariance tower located in the shoreline equipped with an infrared open-path gas analyzer (LI-7500, LI-COR) and a sonic anemometer (R3-100 Professional Anemometer, Gill Instruments), both at about 13 m above the mean sea level, and sampling at 20 Hz.
For some period of time simultaneous information of waves was recorded with a sampling rate of 2 Hz using an Acoustic Doppler Current Profiler (Workhorse Sentinel, Teledyne RD Instruments) at 10 m depth and 350 m away from the tower. Besides, recently the concentration of CO_2 in water has also been recorded making use of a SAMI-CO_2 instrument. A subtle effect of the wave field is detected in the estimated kCO_2. Looking into details of the surface currents being detected very near the air-sea interface through an ADPC, a certain association can be found with the gas transfer velocity. Furthermore, some of the possible effects of breaking wave induced turbulence in the coastal zone is to be addressed.
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