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CO_2 concentration characteristics and possible influence of waves on the rate of CO_2 transfer between the ocean and the atmosphere in a coastal region.

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In order to understand the physical processes involved in the air-sea transfer velocity of CO_2 in a coastal region. The possible influence of the waves as an external agent is studied in order to characterize the CO_2 transfer. The air-sea transfer velocity of CO_2 was calculated from direct measurements of CO_2 flux and CO_2 partial pressure difference at the area of Punta Morro in Ensenada, B. C., Mexico during the period from 13 April to 3 May of 2016.
CO_2 fluxes were measured at the coastline at a height of 10m by a flux measurement tower using eddy covariance method; in the sea, at a distance of approximately 1000m from the measuring tower, a CO_2 sensor (Pro-Oceanus) was used to measure the CO_2 partial pressures in air and sea water at a distance of approximately 2m of the surface. On the sea bottom at a depth of 10m and 400m from the coastline, a CO_2 sensor (SAMI-CO_2) and acoustic profiler (Aquadopp, Nortek AS) were installed measuring CO_2 partial pressure in the sea water and waves, respectively.
The results show that CO_2 concentration is not homogeneous in the study area, we were able to identify both horizontal and vertical gradients of pCO_2 in the air and in sea water. Close to the sea surface, values of pCO_2 in sea water were always smaller than there in air. The measured CO_2 flux was in average negative during our field experiment. The air-sea transfer velocity of CO_2 was obtained, resulting in a subtle relation with the significant wave height incident to the coast.This work is a RugDiSMar project (CONACYT 155793) contribution. Partial support from CB-2015-01-255377 is appreciated.