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Sailing meets Science

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The surface partial pressure of carbon dioxide (pCO₂) is one of the main quantities determining the ocean sink strength for CO₂ and knowledge of surface ocean pCO₂ plays a vital role in monitoring the global carbon budget. However, measuring pCO₂ via infrared absorption requires repeated calibration and drift corrections, and therefore ships are still the major platform for these measurements. Given the limited number and availability of pCO₂ observations, scientists have fostered collaborations with industrial partners, participating in the Ships of Opportunity (SOOP) program, to collect valuable pCO₂ measurements. One fleet, however, has thus far been largely overlooked: sailing yachts. Modern sensor technology to-date allows for low weight and low energy consumption equilibrator systems that can be successfully mounted on recreational and high-performance sailing yachts with good quality data. Here we present the first results from 3 years of autonomous measurements aboard two IMOCA yachts, Seaexplorer -Yacht Club de Monaco (previously Malizia) and Newrest -Art & Fenêtres using a SubCtech flat membrane equilibrator system. First results indicate that sailing yachts provide crucial high frequency measurements to study open and coastal ocean systems, are well suited to study mesoscale variations in the ocean carbon sink and provide measurements beyond industrial shipping routes (e.g. the Southern Ocean). In summary, sail yachts are a promising way forward in order to complement the current observing system for the global ocean carbon cycle in a changing climate.

Team Malizia and Team Newrest: Skipper Boris Herrmann and Team Malizia, Skipper Fabrice Amedeo and Team Newrest - ART & FENÊTRES