



Pacific Greenhouse Gases Measurement (PGGM) Project Ship-Based Measurement 2009-2010 Results

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Atmospheric carbon dioxide concentration is one of the keys for observing present climate and for predicting future climate change. Ground-based stations such as Mauna Loa and other NOAA CMDL stations continuously provide excellent long-term measurements of carbon dioxide, but are limited by its spatial coverage. The main purpose of the PGGM project is to produce accurate, long-term, and sustainable measurements of carbon dioxide over the oceans. In doing so, we can help track global distributions of carbon dioxides following their emissions on a finer temporal and spatial scales, and to work out a genuine global carbon dioxide distribution in the context of rising carbon dioxide emissions. The PGGM ship-based measurements project is supported jointly by Taiwan National Science Council, Taiwan Environmental Protection Administration, Evergreen Marine Corporation (EMC), and National Central University. The ship-based measurements were successfully launched in June 2009. A fleet of 9 in-service routine global container cargo ships from EMC has been equipped with carbon dioxide analyzer and working standard gases, which are traced back to WMO NOAA carbon dioxide standards, to conduct routine high-resolution atmospheric carbon dioxide measurements during the commercial service of these container cargo ships. More than 53 cruises of data have been successfully collected for the routes covering the North Pacific, the Northwestern Atlantic, Indian Ocean, The Red Sea, The Mediterranean, and the Northeastern Atlantic regions. These measurements clearly show elevated carbon dioxide concentrations close to port areas, and more close to background levels during the open oceans.