

Philippines TCCON Installation: Towards Quantifying Atmospheric Carbon in Southeast Asia

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The Total Carbon Column Observing Network (TCCON) is dedicated to the precise measurements of greenhouse gases such as CO₂ and CH₄. TCCON measurements have been and are currently used extensively and globally for satellite validation, for comparison with atmospheric chemistry models and to study atmosphere-biosphere exchanges of carbon. With the global effort to cap greenhouse gas emissions, TCCON has taken on a vital role in validating satellite-based greenhouse gas data from past, current and future missions like Japanese GOSAT and GOSAT-2, NASA's OCO-2 and OCO-3, Chinese TanSat, and others. The lack of reliable validation data for the satellite-based greenhouse gas observing missions in the tropical regions is a common limitation in global carbon-cycle modeling studies that have a tropical component. The international CO₂ modeling community has specified a requirement for "expansion of the CO₂ observation network within the tropics" to reduce uncertainties in regional estimates of CO₂ sources and sinks using atmospheric transport models. A TCCON site in the western tropical Pacific is a logical next step in obtaining additional knowledge that would greatly contribute to the understanding of the Earth's atmosphere and better constraining a major tropical region experiencing tremendous economic and population growth.

An assessment for possible sites in the Philippines where TCCON FTS should be installed were performed and we decided to install it at Burgos site (the substation of Energy Development Corporation Burgos Wind Farm Project), Ilocos Norte, Philippines (18.5326° N, 120.6496° E). We characterized a performance of the newly constructed TCCON instrument intended for deployment to the Philippines and made initial measurements at the NIES compound in Japan. After development in Japan, we deployed TCCON FTS at Burgos site in Dec. 2016 and conducted installation/set up of instruments until Mar. 2017. Then we could get the first light measurements in Philippines. Here, we will present the whole picture of the Philippines TCCON project.

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