[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-CG Complex & General

[A-CG35]Global Carbon Cycle Observation and Analysis

convener:Kazuhito Ichii(Chiba University), Prabir Patra(Research Institute for Global Change, JAMSTEC), Toshinobu Machida(国立環境研究所, 共同), David Crisp(Jet Propulsion Laboratory)

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The Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) is a landmark agreement in the 21st Conference of the Parties (COP21) in December 2016, which aims at reduction of greenhouse gases (GHGs) emission for keeping the global warming below 2 degC. The national commitments and progresses should be carefully monitored and verified by international bodies.

In recent years, the number of observational platforms for monitoring atmospheric GHGs and air pollution species is increasing. National or regional emission inventories have also been prepared at greater resolution in space and time using different methodologies. However, due to uncertainties in modeling and sparse observation network, high uncertainty persists in global and regional sources/sinks estimations, particularly for CO2.

Developing integrated observation and analysis systems for GHGs are the most urgent tasks. Atmospheric transport models, inverse models, and process-based bottom-up models should be tested and improved. The "top-down" (with inverse models) and "bottom-up" (with surface flux/emission network data and ground-based models) estimations have to be reconciled for gaining confidence in verifying the national commitments.

The purpose of the session is to discuss state-of-the-art techniques for estimations of surface budget of GHGs and air pollutants. Ideally, these results would allow us to detect changes at an early stage under the changing climate and human activity, and to disseminate scientific knowledge for mitigation policies in a timely manner. Improved estimates of emissions from land use change, forest fires, and other anthropogenic sources (urban developments and thermal power station etc.) should be addressed. We also welcome discussions for designs and plans for future studies targeting city and country scale emission estimations using sophisticated modeling tools.

[ACG35-P02]Evaluation of a Wall-to-Wall Canopy Height Satellite Product in Boreal Forests

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Keywords:remote sensing, boreal forests, literature survey, canopy height

Forest canopy height is a crucial parameter for studying forest biomass, species diversity, as well as some other ecosystem functions. Satellite Light Detection and Ranging (LiDAR) is the state-of-the-art technique to measure the canopy height at continental/global scales. However, the Satellite LiDAR may miss some of the forests because of the spatial separation of individual spots. Therefore, a number of efforts have been carried out to generate wall-to-wall canopy height product by combining the LiDAR and other data sets. Among these studies, the product provided by Simard et al. (2011) has been extensively utilized in various applications. Nevertheless, it has also been pointed out that the satellite product yielded estimation biases in China’s forests. More extensive validation efforts to other biomes is therefore needed to derive a more comprehensive assessment of the canopy height product. In this study, we validated the global wall-to-wall canopy height product in boreal forests, where plays

important roles in global terrestrial carbon cycles, by using the field measurements obtained from literature resources. Results demonstrated that the satellite canopy height yielded significant correlation with field measurements (R^2 = 0.67, and P<0.001). Estimation biases were observed with the regression slope greater than 1.0 and intercept around -10.0. This relationship is consistent with the validation results for MODIS tree cover product, which is a key input parameter for the estimation of satellite canopy height. The evaluation results indicate that the satellite product needs to be further improved in the boreal forests for future applications.