EARTH OBSERVATION SYMPOSIUM (B1)
GEOSS and Carbon Monitoring from Space (6)

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CARBONSAT CONSTELLATION

Abstract

Carbon dioxide (CO2) and methane (CH4) are the most important manmade greenhouse gases (GHGs) which are driving global climate change. Currently, the CO2 measurements from the ground observing network are still the main sources of information but due to the limited number of measurement stations the coverage is limited. In addition, CO2 monitoring and trading is often based mainly on bottom-up calculations and an independent top down verification is limited due to the lack of global measurement data. The first CO2 and CH4 mapping from SCIAMACHY on ENVISAT shows that satellites add important missing global information. Current GHG measurement satellites have to collect data over a year or even longer to produce global regional fluxes products. Consequently global, timely, higher spatial resolution are required The CarbonSat constellation idea comes out the trade off of resolution and swath width during CarbonSat mission definition studies. In response to the urgent need to support the Kyoto and upcoming protocols, a feasibility study has been carried out. The proposed solution is a constellation of five CarbonSat satellites, which is able to provide global, daily CO2 and CH4 measurement with high spatial resolution 2 2 km .The unique global daily measurement capability significantly increases the number of cloud free measurements, which enables more reliable services associated with reduced uncertainty, e.g. to 0.15ppm (CO2) per month in 10km and even more timely products. The CarbonSat Constellation in combination with inverse modelling techniques will be able to provide information services, such as global quarterly: CO2 and CH4 regional flux updates, CO2 emission reporting from hot spots e.g. the power plant and CH4 emission reporting from hot spots e.g. the pipeline/oil and gas fields. It is proposed that the CarbonSat Constellation will be implemented through an internationally coordinated constellation. Each country contributes one satellite in the constellation and establishes its own ground station to provide data for national applications. A central coordination will be set up for the constellation operation, data calibration and international data distribution. The proposed approach provides independence for each partner and is financially more feasible. The world wide transparency provided by this international forum is critical in supporting Kyoto protocol and upcoming international agreement in man-made Greenhouse emission reduction. The paper will present the CarbonSat Constellation design and the proposed products/ services to verify CO2 and CH4 sources and sinks from a constellation of five CarbonSat satellites through a multilateral collaboration.