

SIBERIA-II and NORTH: Extending Multi-Sensor Earth System Observations to the Circumpolar Boreal Biome

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The main objectives of the EC-project SIBERIA-II are the integration and combination of multi-sensor remotely sensed data and ecological regional models in order to assess the impact of terrestrial biota on the budget of major greenhouse gases (GHGs) in Northern Eurasia and the demonstration of the viability of full carbon accounting (including CO₂, CO, CH₄, N₂O, NO_x) using Dynamic Vegetation Models (DVMs) and multi-sensor Earth Observation (EO) instruments. The tools and systems to be employed include a spectrally and temporally diverse set of multi-sensor Earth Observation instruments and detailed existing databases of field information and vegetation models to account for fluxes between land and atmosphere. Thematic, spatial and temporal requirements for Earth Observation retrieved greenhouse gas accounting parameters have been determined. Operational processing chains using individual Earth Observation sensors have been established to allow assimilation of EO data into the DVMs and the landscape GIS.
The NORTH region is a "hotspot" of the global climate system. Small perturbations in the energy balance may be strongly amplified through physical and biogeochemical feedback mechanisms. Although many long-term systematic observations of marine, terrestrial and atmospheric parameters already exist, these data of diverse nature and source (e.g. in situ and remote sensing) lack cohesive coordination (particularly in Russia and other new independent states), hindering their use in models and linkage to the broader scientific and management community. To improve that situation, NORTH activities concentrate on interfaces, interoperability, integration and tightly co-ordinated linkages between observing systems and other data sources in the high latitudes of two continents: Eurasia and North America, which together constitute the core of the Group on Earth Observations (GEO). The deliverables will be i) long-term, systematic, high quality, validated geo-observational products for monitoring and modelling the key processes, many of which are unique to this region; ii) continuity of existing observation systems and improved European contribution to global observing needs; iii) a diagnostic and forecasting system for environmental change in the northern latitudes needed for adaptation and mitigation policies.
