Session Title:S11 Greenhouse gases exchange from sites to regions

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Abstract:

Global environmental changes affect the productivity and resilience of natural and managed ecosystems across the world. Functioning of terrestrial ecosystems is further affected by atmospheric composition change (e.g., CO_2, O_3 and other reactive compounds) and increased deposition of nitrogen and sulfur compounds, due to an unprecedented perturbation of regional and global nutrient cycles by anthropogenic activities. However, terrestrial ecosystems are not only recipients of environmental changes but are of inimitable importance for atmospheric thermodynamics and chemistry, and thus for the climate system, due to their outstanding role as sinks and sources of water, energy, and greenhouse gases (particularly: CO_2, CH_4, N_2O). Thus, understanding how global environmental changes, and their regional expressions, affect terrestrial ecosystems and their functioning is urgently needed for the assessment of regional to global greenhouse gas exchanges.

Advances in knowledge from observations of land surface – atmosphere interactions, and transfer to models, are fraught with a number of methodological problems and measurement limitations. At the root of most such problems is the spatial variability of land surface characteristics and the temporal response to the combination of daily, seasonal, meteorological, ecological and climatic variability. For the application of ecophysiological and micrometeorological theory in measurements or modeling of greenhouse gas exchanges such conditions are far from ideal and, therefore, the scaling of biosphere-atmosphere exchange from the site-, plot-, or stand-scale to a region of commonly fragmented landscapes is still a great challenge for both observations and modeling.

This session invites contributions from experimental or modeling studies that address such challenges of greenhouse gas exchanges at single sites, clusters, or networks, and ranging from local to larger scales.