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Integrated Land Information System - a relevant step for development of information background for PEEX?

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PEEX, as a long-term multidisciplinary integrated study, needs a systems design of a relevant information background. The idea of development of an Integrated Land Information System (ILIS) for the region as an initial step of future advanced integrated observing systems is considered as a promising way. The ILIS could serve (1) for introduction of a unified system of classification and quantification of environment, ecosystems and landscapes; (2) as a benchmark for tracing the dynamics of land use – land cover and ecosystems parameters, particularly for forests; (3) as a systems background for empirical assessment of indicators of an interest (e.g., components of biogeochemical cycles); (4) comparisons, harmonizing and mutual constraints of the results obtained by different methods; (5) for parameterization of surface fluxes for the 'atmosphere-land' system; (6) for use in divers models and for models' validation; (7) for downscaling of available information to a required scale; (8) for understanding of gradients for up-scaling of "point" data, etc.

The ILIS is presented in form of multi-layer and multi-scale GIS that includes a hybrid land cover (HLC) by a definite date and corresponding legends and attributive databases. The HLC is based on relevant combination of a "multi" remote sensing concept that includes sensors of different type and resolution and ground data. The ILIS includes inter alia (1) general geographical and biophysical description of the territory (landscapes, soil, vegetation, hydrology, bioclimatic zones, permafrost etc.); (2) diverse datasets of measurements in situ; (3) sets of empirical and semi-empirical aggregation and auxiliary models, (4) data on different inventories and surveys (forest inventory, land account, results of forest monitoring); (5) spatial and temporal description of anthropogenic and natural disturbances; (5) climatic data with relevant temporal resolution etc. The ILIS should include only the data with known uncertainties and in details, which would allow assessing most important characteristics of environment and the biosphere (e.g., Net Ecosystem Carbon Budget) within preliminary specified level of uncertainty. The basic spatial resolution is 1km with possibilities to use finer resolution for regions of rapid changes or intensive ecological, atmospheric, hydrological etc. processes.

Experiences of development of a prototype of the ILIS for Russia illustrated advantages of such an approach: a substantial gain in resources and time under organization of multidisciplinary integrated studies; availability of a solid background for development of clusters of integrated models that include meteorological, environmental, climatic, ecological, economic, social and other dimensions; open access to accumulated data, information and knowledge etc. Yet, there are significant difficulties in ILIS developments: a need of a system which would be open for changes and improvements; availability of long-period mechanisms for maintaining the system; possible contradictions with national information policies etc.