

1.4.2 Further Development of Models and Model Improvement

All important exchange processes between ocean, atmosphere and the land surface are acting on scales not well resolved in the current models. Model improvements should be directed to explicitly taking into account the appropriate scales by either adapting the model resolution to the process, or by developing adequate parameterisations. Examples are in- and outflows and dense bottom currents within the Baltic Sea, sea ice diversity, air-sea interactions in coastal regions, precipitation generation and development, effects of land surface heterogeneity on fluxes of energy and matter, ground-water and runoff generation.

Components of regional climate modelling systems, which still need to be developed further, are more detailed treatments of aerosol effects on cloud and precipitation development, inclusion of dynamic vegetation and substances influencing vegetation growth and development (*e.g.* CO₂, N₂), as well as improved treatment of lakes and aquifers.

Further improvement of the increasingly complex regional climate models needs the involvement of an increasing number of researchers often situated in different groups. An adequate organisational structure needs to be set up, which allows for an efficient communication between model developers to better exploit existing knowledge and resources and to shape and implement standards for code development and module coupling. The high quality monitoring of the tropospheric column and the land surface at the three super sites Lindenberg, Cabauw and Sodankylä provides the most complete data sets currently available for these tasks. These sites should therefore be integrated in the model development network, thus also taking advantage of their experienced scientific staff.