

Plenary Address I

Monitoring of the Land Surface and Simulation of the Water Cycling aiming for Sustainable Water Utilization

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Abstract

According to UNEP (1997), arid lands (including semi-arid area) accounts for 38% of the total terrestrial area. In these regions, evapotranspiration exceeds precipitation, which is less than 500 mm. Arid Land Greening Team in Tokyo University of Agriculture has been working, for 25 years, on greening projects in Djibouti, North-eastern African arid land where the annual rainfall between 100-170 mm. In the present presentation, our recent research topic on monitoring of the land surface and simulation of the water cycling are introduced. Aiming for sustainable water utilization, groundwater storage potential and greening potential are tried to be evaluated and delineated. Through those arid land study works, progress may be anticipated on some of the UN sustainable development goals, i.e. achieving food security and promoting sustainable agriculture with ensuring availability and sustainable management of water.

Water Cycling Simulation

With recent advancements in computer technology and numerical methods, researchers have been able to develop physical based models to simulate runoff and groundwater flow on watershed scale. The present address introduces the recently

developed watershed modeling tool for simulation to estimate the water flow in both surface (Manning's flow) and subsurface sections (Generalized Darcy's flow) of a basin watershed, the fluids flow code GETFLOWS (Tosaka et al., 2000) (Fig. 1). A 3D flow model of a watershed was developed in order to simulate the watershed runoff and the groundwater flow. In this work, a 3D groundwater flow model constructed with GETFLOWS

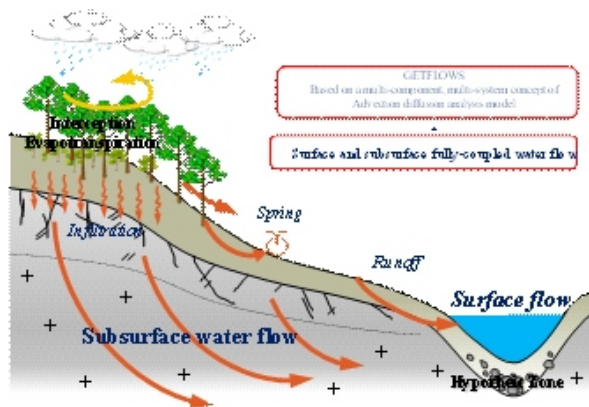


Fig. 1 Conceptual model of GETFLOWS simulator.