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title: # A parallel groundwater regime and vegetation pattern analysis of the groundwater dependent ecosystems at the South Danube-Tisza Interfluve, Hungary

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The investigated area lies on the Danube Tisza Interfluve where a gravity driven and surface morphology (topography) controlled groundwater flow regime occurs. The regional groundwater flow is orientated towards Danube and Tisza lowlands from the central ridge region.

At the region of interest there are several dune slack meadows which are groundwater dependent ecosystems, therefore the knowledge of groundwater systems is one of the most important aspects in the protection of ecologically valuable areas. The main goal of this study is to reveal the connection of hydrological backgrounds and vegetation pattern.

Two sites of about 100–100 ha large dune slack meadows were chosen for detailed botanical and hydrogeological investigation because of its unusual richness in protected plants. Both areas are involved in the Natura 2000 network. The studied areas are situated near to the midline zone of groundwater flow system regionally, but they bear marks of discharge zone locally. The vegetation was sampled along a 500 m long transect in one site and a 380 m long transect in the other site, respectively. The transects were positioned approximately along the line determined by observation wells, crossing stands of the relevant vegetation types. Coenological relieves were made in 5×5 m quadrates and the percentage cover of plant species was recorded in June, 2005 and 2009. It is understood that, the distinct hydraulic characters are the source of the different vegetation patterns in the studied areas. The different vegetation types can move on the surface according to groundwater level changes. If the groundwater level decreases significantly, the drought-resistant plants take the hydrophilic plants place.

Our study other aims to provide a prediction of shallow groundwater level changes as the effect of climate change resulted in lower precipitation and recharge rates on the study area. A common conceptual hydrogeological model has been created and tested.

There are some indications of regional drawdown; thus many formerly artesian wells today characterized by a static groundwater table lower than 10 m below the surface in vicinity of main recharge areas.

As a final result of the model we have been able to assign those areas where the biggest decline of water level due to happen. The hydrological changes, especially the decrease of groundwater compared with the observed vegetation map. The main result of this study is to reveal the connection of hydrological backgrounds and vegetation pattern.

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