

Summary of the discussion on “Recharge of karst aquifers by surface water under arid and semiarid conditions”

JENS LANGE (rapporteur) and the convenors

There was an initial debate over what features should be regarded as “real” karst and what should be regarded as pseudokarst. Pseudokarst was regarded as being developed on various non-carbonate lithologies due to salt crystallization and it was agreed to confine discussion to karst within limestone areas. Participants were of the opinion that, due to the lack of extensive recharge in arid and semiarid areas, both karst and pseudokarst phenomena result from long-term processes. It was felt that it is important to distinguish between young shallow karst, which is still active, and old deep karst systems that were formed a long time ago when other climatic conditions prevailed. Along the shorelines coastal karst phenomena may also be important.

Due to the great variability of climate, vegetation, soil, morphology and lithology within arid and semiarid regions, there are no general rules to describe recharge processes of karst aquifers. In semiarid regions, the role of soil and vegetation cover enhancing evapotranspiration losses must be better understood. Additionally there is a lack of knowledge concerning recharge by infiltration losses during ephemeral wadi floods. With increasing aridity this source of recharge becomes more and more dominant. The structure and vertical extent of the channel alluvium are important, although the exact relationships with the amount of infiltration losses are unclear. In most arid and semiarid regions there is a lack of high quality data sets describing wadi transmission losses and it is important to obtain this information.

In general there is a need for future work combining several assessment tools to study the dominant recharge processes in arid and semi arid karst aquifer systems. As a precondition good data records are needed covering surface and subsurface water. Time series modelling of karst springs and piezometric levels should be undertaken in semi arid and arid regions. Tracer techniques are still the key tools for experimental investigations. Environmental isotopes offer the chance to study infiltration and evaporation processes over large scales both in space and time. In semi arid regions with spatially distributed recharge this technique is often the only way to quantify the amount of available groundwater. In arid areas, where the dominating recharge processes often take place over shorter time scales and are spatially concentrated, additionally artificial tracers become applicable. Thinking about the high flow velocities within karst aquifers and the temporally limited linear wadi recharge even longer distances may be investigated.