

Peer Review of **“Hydrological functions of sinkholes and characteristics of point recharge in groundwater basins”** by N. Somaratne et al

Point source recharge to karst aquifers through sinkholes is an important hydrologic process in karst systems. In some karst systems point source recharge may be the major process of aquifer recharge, thus gaining additional knowledge in this process is critical. The authors attempted to address this process at three case studies by using environmental tracers, salinity, and chloride analysis of rainwater, surface water and groundwater. The authors also attempted to use the conventional chloride mass balance (CMB) approach to understand diffuse versus point sources recharge.

The hydrologic analysis of the three case studies are interesting and should be of help to local water managers trying to manage their karst aquifer. I had difficulty in understanding the authors research design and methods used to answer the questions of point source versus diffuse recharge at the three case studies. The research looks like a body of work using existing data at the sites, ie. total dissolved data at Uley South Basin, chloride data at Mount Gambier Blue Lake, and general geochemical analysis at Poocher Swamp. It was nice to see environmental tracer data but the plots of chloride versus ^{18}O were not convincing when it came to defining point recharge.

I was very excited to see the recharge conceptual model (Figure 9) for Uley South Basin, but there was no experimental results presented to either confirm or dispute this conceptual model. I had thought this was what the paper was about.

Lastly, the authors concluded that the CMB does not work very well in karst systems and needs to be modified. That would have been the research contribution of this paper. In other words develop a research effort to collect the needed data to modify the CMB method for karst. Otherwise I do not see any new findings or methods for publishing this work in HESS.