

Analyzing origin of rainwater and shallow groundwater in seasonal wetlands of north-central Namibia

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This study discussed on origin of rain- and subsurface-water (or shallow groundwater) in seasonal wetlands of north-central Namibia, which is locally called as the Cuvelai system seasonal wetlands (CSSWs). In order to do this, stable water isotopes (SWIs) of hydrogen and oxygen in rain-water, surface-water and subsurface-water were analysed. Especially rain-water samples were taken from all rainfall events in a whole wet season from October 2013 to April 2014. Then the isotopic ratio of SWIs in each rain-water sample was analyzed and used to derive annual mean value of the isotopic ratio of SWIs in precipitation weighted by each rainfall amount. This annual mean value was revealed to be a good indicator in order to detect how subsurface-water in CSSWs formed in the region through the use of delta diagram. Consequently the SWIs analysis in rain-, surface-, and subsurface-water revealed that shallow groundwater of small wetlands in the region was very likely to be recharged from surface-water, source of which was local rain-water and was temporary pooled in the lowest part of each small wetland. This was supported from the tritium counting of the current rain- and subsurface-water in the region. In order to confirm the origin of rain-water, atmospheric water budget analysis was also conducted using an atmospheric reanalysis data. From this analysis, it was found that around three-fourths of rain-water was derived from recycled water in local-regional scales.

Keywords: atmospheric water budget, stable water isotopes (SWIs), water-food security