



Stable isotope and hydro chemical variability along the Calueque-Oshakati Canal in the Cuvelai-Etosha Basin, Namibia

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Since 1973 Kunene River water (currently between 47 and 63 Million m³ per year [1]) is carried from the Calueque Dam in Angola along a 150 km concrete canal to Oshakati in the Cuvelai-Etosha Basin which supplies the most densely populated area of Namibia with drinking water. Backup storage is held in the Olushandja Dam and in water towers at Ongongo, Oshakati and Ondangwa and about 4,000 km of pipelines radiate out from purification schemes and supply most of the people and the livestock [2, 3]. The canal is open along most of its course to Oshakati, allowing livestock and people living nearby to make free use of the water. During the rainy season, flood water from the vast Oshana drainage system swashes into the canal bearing a potential health risk when consumed untreated. Within the SASSCAL project (Southern African Science Service Centre for Climate Change and Adaptive Land Management – www.sasscal.org) water samples were collected during a field campaign from 18th to 20th November 2013 right before the onset of the rainy season 2013/14, to gain information on water evolution, evaporation and mixing influences as well as to characterize input concentrations for indirect recharge in this area. Water samples were collected at 14 sites along the canal (about every 10 km) and the Kunene River for stable water isotopes (deuterium and oxygen-18) and hydro chemical analyzes. Coordinates and altitude, temperature, conductivity, pH-value, and oxygen content were measured in the field. Hydro chemical and stable isotope analyzes were conducted later on in the laboratory. For stable isotopes a Picarro L2120-i water vapor analyzer was used with accuracies of 0.2‰ and 0.8‰ for $\delta^{18}\text{O}$ and $\delta^2\text{H}$, respectively. Further campaigns within and after the rainy season are planned. A discussion of isotope and hydro chemical evolution of canal water in comparison to local rain and available groundwater composition will be presented.

[1] Directorate of Rural Water Supply (2004): Directorate of Rural Water Supply 1993- 2003. Ministry of Agriculture, Water and Rural Development, Windhoek, Namibia, 64 pp.

[2] Mendelson J., Jarvis A., Robertson T. (2013): A profile and Atlas of the Cuvelai-Etosha basin. Ministry of Agriculture, Water and Rural Development, Windhoek, Namibia, 170 pp.

[3] Christelis G., Struckmeier W. (Eds) (2001): Groundwater in Namibia – an explanation to the Hydrogeological Map. Department of Water Affairs, Ministry of Agriculture, Water and Rural Development, Windhoek, Namibia, 128 pp.