



What can $\delta^{7}\text{Li}$ tell us about sources and flow paths of river water (Western Pamir, Tajikistan)?

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The high alpine regions in Central Asia are the headwaters for big river systems such as the Amu Darya, which is intensively used for agricultural purposes. For the local water resources management it is important to understand the key factors and processes of runoff generation. It is assumed, that the dominant factors for runoff generation are glacier and snow melt in the Pamir Mountains. However the influence of ground water to river water is also an important factor but still not well understood. We investigated the River Gunt catchment as an exemplary catchment for the Pamir Mountains to identify the origin and to quantify the portion of ground water. Thereby we analyzed water samples of river water, subsurface water, thermal water and glacier water for $[\text{U}+\text{F}064]7\text{Li}$.

We detected a wide range of $[\text{U}+\text{F}064]7\text{Li}$ values (from +7‰ to +30‰, whereas the highest values were measured in the glacier melt water at the glacier snout ($[\text{U}+\text{F}064]7\text{Li} = +28.8\%$ which are similar to the $[\text{U}+\text{F}064]7\text{Li}$ value of sea water, the lowest values were found in the samples of thermal water and springs in solid rock ($[\text{U}+\text{F}064]7\text{Li}$ between +8‰ and +11‰, the samples of river water are more or less placed on a mixing line in between.

We assume that tributaries showing an isotope signature similar to the glacier ones are mainly controlled by melt water while water samples with $[\text{U}+\text{F}064]7\text{Li}$ values comparable to the $[\text{U}+\text{F}064]7\text{Li}$ values of subsurface water samples pass through the underground or have a strong interaction between river water and river bed. The water samples of the main stream Gunt also show low $[\text{U}+\text{F}064]7\text{Li}$ values so we assume a strong contribution of subsurface water to the total runoff or an intensive water-rock-interaction in its riverbed.