$\Delta^{17}O$, $\delta^{17}O$, $\delta^{18}O$ variation in precipitated water at Jungfraujoch (3571 m) - relation to meteorological parameters and low altitude stations

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We have analysed precipitated water sample of seven stations from high altitudes Jungfraujoch (3571 m) to low altitudes Basel (292 m). $\Delta^{17}O$, $\delta^{17}O$, $\delta^{18}O$ was analysed for Jungfraujoch (A) from 1983 to 2011 and Grimsel (B), Guttanen (C), Meiringen (D), Locarno (E), Bern (F) and Basel (G) from 2003 to 2005. pH, temperature, relative humidity, air pressure and precipitation data was available through MeteoSwiss. $\Delta^{17}O$, $\delta^{17}O$, $\delta^{18}O$ and pH variations were analysed by using the conventional CO_2-equilibrium method and a pH sonde with a repeatibility of ± .01 pH unit. Positive correlation were found between $\delta^{18}O$ & $\delta^{17}O$, temperature and relative humidity, while poor correlation were found between $\Delta^{17}O$ & $\delta^{18}O$, $\Delta^{17}O$ & $\delta^{17}O$, pH & relative humidity, air pressure and precipitation of all station. Year 2003, one of the hottest period of Europe and at the same period, highest $\Delta^{17}O$ values were observed at station A, C, D, G but not at station B, E & F which require further in-depth research. Interestingly, the decreasing trend of pH was observed at all stations. Except at the station G, highest pH of all stations was greater than 10 pH unit while lowest pH was less than 3 units at station A. Only station A is mostly exposed to the free troposphere and receive signals at a continental scale. Contrary to all others stations, low pH was observed mainly during 1991 to 1993 period at station A, which is originating most probably from multiple large volcanic erruptions (Pinatubo, which was 2nd largest eruption of 20th century). Increasing concentration of atmospheric CO_2 have only a small effect on pH changes in precipitated water compared to the results we have observed. Further explainations will be given in the presentation.

U-Pb Dating of Carbonates and Fluorite: Prospects for Understanding Fluids from Deposition Through Burial

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Minerals such as carbonates and fluorite record information about the fluids from which they formed such as the salinity, temperature, degree of rock-water interaction, as well as details of the source(s) of these fluids. The U and Pb concentrations, U oxidation state and molecular speciation and Pb isotope compositions in these minerals may reveal important information about the nature of the fluids and, in favorable cases, can be used to date the time of mineral formation. The application of emerging *in situ* microbeam analytical techniques such as synchrotron XRF, LA-ICP-MS, and SIMS offers the possibility of tracking the mineralogical and geochemical evolution of these minerals from the time of deposition of limestones through burial diagenesis, faulting and vein formation. Dating of the time of deposition provides a framework for understanding the climate history and fossil information encoded in the rock. Key genetic aspects for ore and hydrocarbon deposits could be provided by a more thoroughly dated history of formation. The timing of tectonic events may be constrained by dating vein fillings of associated fault and fracture systems.

Studies have shown great potential for U-Pb and U-series dating of carbonates precipitated from meteoric fluids and for dating of vein calcite, associated with faulting and with ore mineralization. We will review these studies with insights based on synchrotron and laser ablation work, and present new work on the application of U-Pb dating of fluorite and calcite from a variety of settings, and discuss the expanding applications of these methods to geological problems.

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