Isotope distribution of dissolved carbonate species in Serbian thermal waters

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In this paper we will discuss the results relative to the major ion composition of the thermal waters, along with the $\delta^{13}C$ composition of the dissolved inorganic carbon, and to evaluate the interaction processes occurring between gas and thermal reservoirs in different geodynamic environments as well as the origin of dissolved CO_2. The $\delta^{13}C$ of CO_2 leaving thermal springs ranges from -8.2 to 5.6 ‰ (vs. PDB, n=9), while the $\delta^{13}C$ of dissolved inorganic carbon (DIC) in water ranges from -18.4 to +1.8 ‰ (n=53) [1] (Fig. 1).

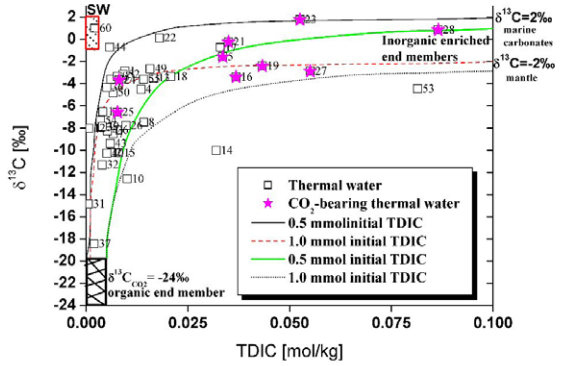

Figure 1: TDIC (Total Dissolved Inorganic Carbon) contents vs. $\delta^{13}C_{DIC}$ togather with $\delta^{13}C_{CO2gas}$ (theoretical) for thermal waters [2].

Water isotope compositions indicate that most waters are meteoric in origin or resulting from mixing between meteoric water and heavy isotope end members.

[1] Miljevic *et al.*(1996) *J. Serb. Chem. Soc.* **61**, 831–840.
[2] Grassa *et al.* (2006) *Pure Appl. Geophys.* **163**, 781–807.

Effect of ocean acidification on processes in the ocean

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The burning of fossil fuels has increased the pCO_2 in the atmosphere from 280 ppmv to 385 ppmv over the last 200 years. This increase is larger than has occurred over the past 800 ky. Equilibration of this CO_2 with surface waters will decrease the pH (called Ocean Acidification) from current values of 8.1 to values as low as 7.4 over the next 200 years. The decrease in the pH of ocean waters can affect chemical and biological processes that occur in the oceans. Many recent studies have shown that ocean acidification can affect the production and dissolution of $CaCO_3$ (s) microorganisms in surface waters. Ocean acidification can also affect ionic equilibria such as acid-base and the formation of metal complexes. Many oxidation-reduction reactions of metals are also affected by changes in the pH.

In this paper, I will examine how ocean acidification of seawater can affect the state of metal ions. The decrease in pH can cause a decrease in the concentration of inorganic (OH^-, CO_3^{2+} ions) and organic ligands that complex many metals in natural waters. This will change the speciation of many metals in seawater. Uncomplexed Cu^{2+} is toxic to bacteria and phytoplankton while uncomplexed Fe^{2+} is more available for the growth of phytoplankton Since organic ligands in natural waters can form strong complexes with metals, more studies are needed on the effect of metal organic complexes.