MIS34-P18 Room:Convention Hall Time:May 27 18:15-19:30

Cave air monitoring and chemical analysis of drip water at Inazumi cave, Oita, Japan

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10 month cave air monitoring and chemical analysis of drip water were conducted at Inazumi cave, Oita, Japan, from February to December, 2014, to understand the processes and mechanism of recording paleoclimate in stalagmite. Cave air CO_2 was measured for the cave monitoring, and EC, pH, HCO_3^- and Ca^{2+} were measured for chemical analysis of drip water.

Special sampling techniques were designed for two sampling sites, SS2 and SS3, to highlight the relationship between cave air CO_2 and drip water chemistry. At SS2, the drip waters, before and after hitting on three handrails arranged in tandem in limestone cave (SS2-U, -M2, -M3 and -L, respectively), were sampled. At SS3, the drip waters, befor contacting with the cave air (BCWA) and after hitting on the artificial stalagmite, were sampled (BCWA, SS3-U, -M, -L, respectively).

At SS2, as the drip water hit on the handrails, HCO_3^-, Ca^{2+} and EC showed decreasing trend respectively and this trend became significant during winter when the cave air CO_2 was low. Only pH was negatively correlated with other drip water parameters the above. This suggests that the two conditions, 1) the cave air CO_2 is lower and 2) water film gets thinner as the drip water hits on the handrails, promote more CO_2 degassing and $CaCO_3$ precipitation.

At SS3, HCO_3^- and Ca^{2+} between BCWA and the drip water after contacted with the cave air showed almost the same concentration during summer, high cave air CO_2 season, however, marked significant margin between them during winter, low cave air CO2 season. This result suggests that once drip water contacts with lower cave air CO_2, more CO_2 degassing and CaCO3 precipitation are promoted.

S.I.cc, standing for Saturation Index of Calcium Carbonate, and $\triangle pCO_2$, the difference of partial pressure of drip water ($pCO_{2-dripwater}$) and of cave air ($pCO_{2-caveair}$), were calculated if CO_2 degassing and $CaCO_3$ precipitation takes place or not. S.I.cc showed positive value at SS2 and SS3 during almost all monitoring periods, indicating $CaCO_3$ is produced almost all the time. However, $\triangle pCO_2$ showed frequently negative value at SS2 and SS3, indicating that CO_2 is not degassed from the drip water and the following $CaCO_3$ precipitation is not taken place and that most of drip water sampled already degassed CO_2.

This research implied that CO_2 variation is a main forcing factor to control HCO_3^- and Ca^{2+}, main components in drip water to form $CaCO_3$-made-laminae used for reconstructing paleoclimate; however, the calculation of $\triangle pCO_2$ showed that $CaCO_3$ would not be produced from drip water. To solve the contradiction, another approach such as development of new sampling method will be necessary.

Keywords: Paleoclimatology, Stalagmite, drip water, cave air monitoring