

FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

Project Title: Paleoclimate Study based on High Time Resolution Analyses of Stalagmites

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1. Background of research

As previously reported in Watanabe et al. (2010), carbon and oxygen isotopic variations of a stalagmite, which was sampled at western Java, Indonesia, have a negative correlation with instrumental rainfall records during AD 1950-1975, suggesting that isotopic ratios of stalagmites are useful proxies for reconstructing ancient rainfall amounts.

2. Research objectives

In this project, in order to reconstruct annual rainfall amounts over the last 1000 years, we will analysis carbon and oxygen isotopic ratios of stalagmites in Indonesia and Japan. Compared to previous studies in China and India, we aim to decipher the detail of temporal rainfall variations in Asia and the mechanism.

3. Research characteristics (incl. originality and creativity)

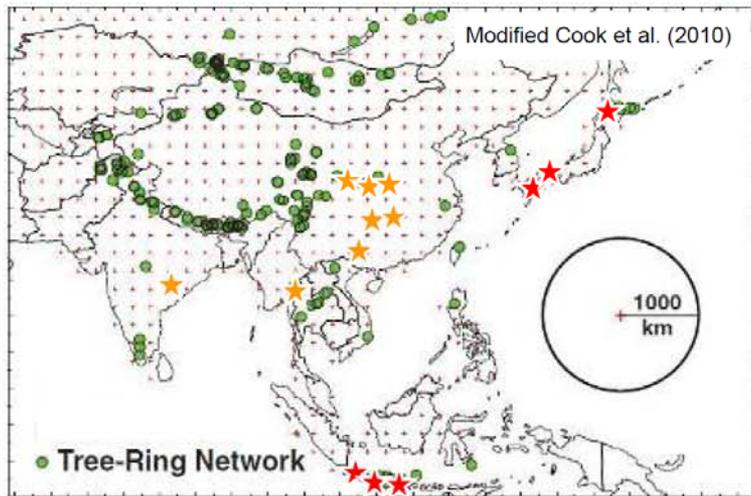
Stalagmite's geochemistry has been widely recognized as a powerful tool to reconstruct past rainfall amounts of terrestrial area (e.g. Fairchild et al., 2006; Wang et al., 2008; Zhang et al., 2008). Although almost previous studies focus on the area from middle latitude to high latitude, we are curious about the precipitation reconstruction at low latitude. It is critical that we appreciate temporal rainfall variations of low latitude because the equatorial region plays a very important role of global climate such as El niño/La niña.

4. Anticipated effects and future applications of research

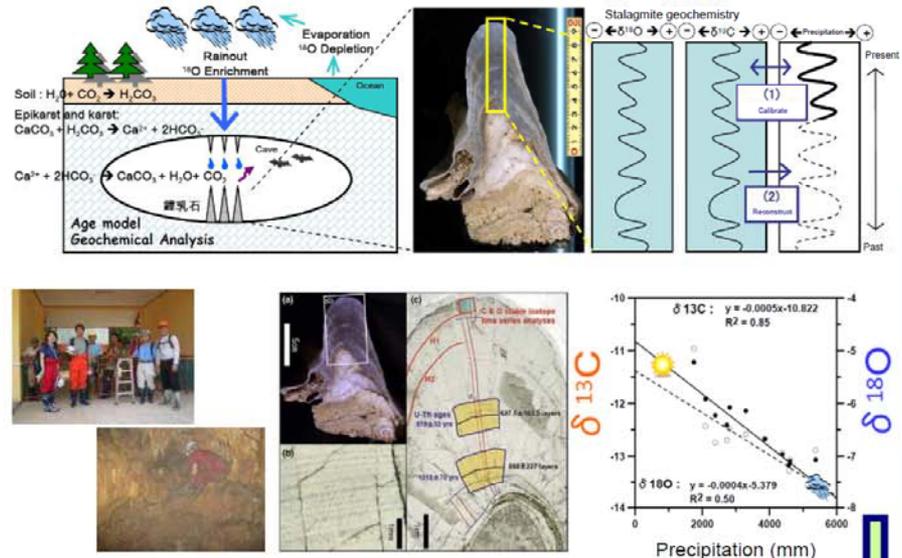
IPCC-AR4 (2007) reported that precipitation prediction still remains the critical issue of low reproducibility among numerical models. Because Asia is especially a densely populated region and might be suffer terrible weather disasters such as flood/drought, "Asian past rainfall information", which is provided by this project, can be expected to be basic data for the precipitation prediction.

Paleoclimate Study based on High Time Resolution Analyses of Stalagmites

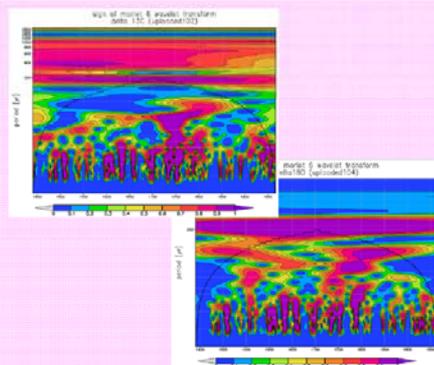
Study area



C&O analyses of stalagmites



Reconstruction of annual precipitation over the last 1000 years



- ⊕ Grasp temporal precipitation variations in Asia
- ➔ Compare precipitation data with the controlling factor (e.g. solar activity; monsoon; ENSO)
- ➔ Appreciate the mechanism of precipitation in Asia
- ➔ Reevaluate/Improve precipitation prediction models