[JJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-CC Cryospheric Sciences & Cold District Environment

[A-CC29]Ice cores and paleoenvironmental modeling

convener:Ryu Uemura(University of the Ryukyus), Kenji Kawamura(National Institute of Polar Research, Research Organization of Information and Systems), Ayako Abe-Ouchi(東京大学大気海洋研究所, 共同), Nozomu Takeuchi(Chiba University)

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Analyses of ice cores from polar and mountain regions have contributed to the reconstruction and understanding of the past environmental changes on timescales from years to several hundred thousand years. In this session, we welcome paleoenvironmental studies using ice cores and paleoclimatic modeling. Studies on reconstruction methods, recording processes and new paleoenvironmental proxies, technical aspects of paleo-modeling are also welcomed. Studies with marine sediment cores, terrestrial sediment cores and tree-rings on similar timescales are also important and welcomed, in order to discuss past environmental changes from multidisciplinary viewpoints.

[ACC29-P02]A proposal of new paleoclimate reconstruction method based on the technique in signal processing field

*Akira Harada[1] (1.Institute of Industrial Science, The University of Tokyo, Yoshimura Lab)

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These days, the extreme weather which is getting severer toward human society can have been regarded as a part of the climate variabilities. However, we don't have enough understanding of climate variabilities, so that paleoclimate research has been progressed for the complementation of it.
Past researches about paleoclimate reconstrcution using proxy data have many problems that they focued on only local matters and didn't consider unsteadiness of climate variabilities. This research aimed at quantitatively analysis of paleoclimate variabilities based on the long-term proxy data around the world with proper singal processing method. At first, I think much of undteadiness of frequency and used Short-Time Fourier Transform(STFT). This method is useful for the wave that dominant frequency is changing as time goes. In addition to that, I proposed an algorithm, which can derive the dominant frequency from the STFT result automatically. As a result, I succeed a reconstruction of paleocliamate based on the signal processing and can not only get a climate variabilities that has been already shown in the previous studies but also reveal that each frequency with a diffrent period has a original variabilities pattern. At the same time, in terms of a spatial correlation of proxy data that hasn't been enough analysed yet I define "spatial representativeness", which enables me to evaluate correlations quantatively. This suggests localer adaptation of proxy data than past researches used, and lets me propose a concrete threshold that exclude accidental correrations. Second, I analysed a singularity intensity that shows an abrupt change quantatively with a technique named "Time-MultiFractal Analaysis"(TMF). TMF results suggest that variability patterns of same type proxy data are similar and related to historical events, so that TMF has a potential for a valid method for the paleoclimate reconstrcution. The results of this reseach not only help reconfirmation of what a signal processing can do for the paleoclimate reconstrcution but also become a fundmental of quantative evaluation.