E221-P023 **Room: Poster Session Hall** **Time: May 17**

Characterizing magnetic nanoparticle populations using temperature- and frequency-dependent susceptibility

Koji Fukuma[1]

[1] Dept. Environ. Sys. Sci., Fac. Engi., Doshisha Univ.

Particle size distributions of magnetic nanoparticles were estimated by applying various analytical methods for alternating current (AC) susceptibility data. Magnetic properties of particles near SP-SD boundary exhibit high sensitivity to particle size especially in AC susceptibility. Nanometer sized stoichiometric magnetite and Ti-poor titanomagnetite particles are indeed carriers of stable remanent magnetization but their particle size distributions are also indicative of past environmental conditions.

Analysis of AC susceptibility data has been expected to provide a quantitative estimate of particle size distributions. However, AC susceptibility depends on the microscopic coercivity distribution as well as the particle size distribution, and measured AC susceptibility is considered to represent the convolution of these factors. At present, unblocking temperature distribution or coercivity distributions were obtained by applying other independent measurements, then the AC susceptibility values were calculated based on these measured distributions. Recently a deconvolution method was developed to analyze AC susceptibility data by assuming the volume as a function of the magnitude of energy barrier against magnetization reversals. They could give reasonable volume distributions but still rely on an assumption that the volume linearly depends on the magnitude of energy barriers and require the effect of large magnetostatic interactions to conform consistent results. A variety of analysis methods described above are applied to our AC susceptibility data obtained from obsidian and loess samples.