

Preliminary Results of Environmental Magnetic Study of Dream Lake, Tatun Volcano

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Abstract

Environmental magnetic proxies are applied to analyze two lacustrine sediment cores taken from the Dream Lake of the Tatun Volcano. The maximum length of the cores is about 233 cm. Generally the abundance of the magnetic minerals are very low except two peaks appeared at the depths 60-90 cm and below 210 cm. The deeper one has the magnetic susceptibility more than three times of that of the shallow one. However, the deeper one has the slight lower values of the parameters SIRM, bIRM, HIRM, ARM and NRM than those of the shallow one. This phenomenon suggests that the deeper level contains much more magnetic minerals than the shallow one, but the grain size of the magnetic minerals should be much coarser. The parameter, ARM versus magnetic susceptibility, just reflects the truth of the grain size variation. The origin about the formation of these two levels might be due to either the eruption of the Tatun Volcano or the tectonic events, such as very severe earthquakes just as the 1999 Chi-Chi earthquake happened close to the Tatun Volcano. The later mechanism is preferred to suggest, because the precedent one is relative harder to elucidate the grain size variation of the magnetic minerals. If it was due to severe earthquakes, the earlier one should have the hypocenter closer to the Dream Lake than the later one. Unfortunately we don't have the age constrain now, or we can apply this method to paleo-seismic investigation. In addition, the proxy, S-ratio, indicated four low values appeared at the depth between 130 and 210 cm. The oxidation grades of the magnetic minerals at these 4 places undoubtedly are high. It might propose relative dry periods have happened at northern Taiwan during these four time intervals.