Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02834, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02834
EGU General Assembly 2008

Geochemistry and mineralogy of the pyroclastic layers in lake records (ELSA cores) from the West Eifel maars, Germany

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The first results of a detailed geochemical and minerological study of several ELSA (Eifel Laminated Sediment Archive) cores are presented. Seven long cores have been investigated in order to better constrain their ages and relationships with the main eruption of the Eifel region for the last 200 kyr BP.

The core D3 from the Dehner maar is 88 m long, JW3 from the Jungferweiher maar is 147 m, WD from the Walsdorf maar is 89 m, HL2 and HL4 from the Hoher List maar are respectively 57 and 53 m, SM from the Schalkenmehren maar is 10 m and Ei1 and Ei2 from the Eigelbach maar are 39 m and 67 m, respectively. The maars cover different time spans during the Last Glacial Cycle, are located in different geographic positions, and each of them preserve evidence several volcanic events.

More than 145 macroscopic pyroclastic layers were identified in the cores, but only 75 have been distinguished as primary tephras. The morphology of the glass material as well as the composition of the main mineral phases has been described in detail using binocular microscopes. Glass shards and vesiculate pumice fragments were chemically analyzed for major and trace elements through EDS analyses. Chemically, the pyroclastic materials analyzed fall within four different fields of the TAS diagram (Le

Bas et al. 1986). Most of the tephras are foiditic, with the remaining showing phonolitic, basaltic trachyandesitic and trachytic compositions. Clinopyroxene (titanoaugite) and mica (biotite and phlogopite) are the most abundant mineral phases. Olivine and sometimes amphibole are also present. In some layers from cores WD and JW3 euhedral and well preserved crystals of leucites have been recognized and collected for Ar/Ar dating (work in progress). Sphene is also present in a couple of layers from core JW3.

Comparing the chemical composition of the pyroclastic material, the mineral assemblages and mineral chemistry of the main phases, several hypothesis of correlation with established regional tephrostratigraphical markers are presented. Two layers are possibly linked with Laacher See Tephra (12.9 kyr BP, Bourdon et al. 1994), three with Dümpelmaar Tephra (116 kyr BP, van der Bogaard et al. 1989) and one with Glees Tephra (151 kyr BP, van der Bogaard et al. 1989).

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