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The reconstruction of wind directions for the Eifel region (Western Germany) during the period 45 - 15 ka BP

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To calibrate climate model simulations it is necessary to compare them with proxy data that represent the same period. On the other hand, it is essential for the climate community to achieve model data that help to understand the forming processes. Actually, we are able to present a proxy dataset, which could help modellers to calibrate their long term simulations of wind systems over Central Europe. It is a dust proxy, which allows the interpretation of paleo wind directions during the period 45.000-15.000 a BP. The first occurrence of dust in the Eifel at the end of the last interglacial is called the Late Eemian Aridity Pulse (LEAP, Sirocko et al. 2005) which is called C26 in ocean records. Based on these results we developed a long dust / loess time series for the Eifel region, Germany. The complete stack (0-140 ka)is a compilation of four different sediment cores (HL2 -dry maar west of Hoher List; De3 - Dehner Maar; OW1 - Oberwinkler Maar; SM3 - Schalkenmehrener Maar). We use the particle analysis module RADIUS (Rapid Particle Analysis of digital Images by ultra-high-resolution scanning of thin sections, Seelos & Sirocko, 2005) to analyse and identify the different sediment structures of all ELSA stack cores. The application allows the detection of climate controlled sedimentation processes like storm events under cool and dry conditions or fine laminated sequences during warm periods and spontaneous events like volcanic eruptions, slumps and turbidites. Additionally, a method to measure the content of carbonates, based on an adapted colour detection algorithm, is implemented into the RADIUS particle detection system. The content of loess/dust and carbonates (20-63 μm) carries information about the provenance of the windblown particles in the ELSA core sequences. Wind transported carbonates are detected as single grains

inside the loess sections with the same grain size than the other dust components or as coatings around the quartz grains. To reconstruct the wind directions during MIS3 - MIS2 (45.000 - 15.000 a) for the Eifel region, we analysed the ELSA core sequence DE3 (Dehner Maar) about the content of carbonates and loess. The dry maar is located on the west side of a large carbonate basin that crosses the region in north-south direction. There are no carbonate sources in the nearer western region of the Dehner Maar. All other maar lakes, that are part of the ELSA loess stack, are located at the east side of the basin. The wind direction module of RADIUS works in the following way: if the content of carbonates (20-63 μm) in a detected loess sequence of the analysed sediment is higher than 15 %, we assume east winds, because the wind crosses the carbonate basin and lime particles are looped up. The autochthon carbonate production in the maar lakes during this dry and cold period is very low. The measured ground noise signal for the content of autochthon carbonates over all core sequences is about 3-5 %. The transition from MIS 3 to MIS 2 is represented by an overlapping of two core sequences, The DE3 and the OW1 sequence, which is a dry maar at the east side of the carbonate basin. This transition term can be used as a control run for the wind direction algorithm of RADIUS. The coexistence of low carbonate values in the OW1 core and high values in the DE3 core during the loess phases are indicators for east winds. The analysis results of the overlapping sections show the direct connection between the two core sequences. Looking at the whole record, west winds are dominating the period MIS3 - MIS2. The appearance of east winds during this time spread is about 10 %.