Relative changes in geomagnetic field intensity and their direction over the last 16,000 years BP were recovered from the study of three high resolution records obtained from two Swiss lakes (Soppen 47° 5′ 25′ N, 8° 4′ 51′ O and Baldegg 47° 11′ 55′ N, 8° 15′ 38′ O). Rock magnetic analysis, including the alternating field (AF) demagnetization of natural remanent (NRM) in 23 steps up to 80 mT, AF acquisition of anhysteretic remanent magnetization (ARM) in the same fields with a bias field of 0.1 mT, isothermal remanent magnetization (IRM), hysteresis loops, coercivity (Hc), remanent coercivity (Hcr), saturation magnetization (Ms), remanent magnetic moment (Mr), show that the main magnetic carrier is magnetite of biogenic origin. Grain size indicative parameters shows that single domain (SD) particles dominate (e.g. ARM/IRM > 0.1, Hc/Hcr between 1.47 and 1.9, Mr/Ms between 0.37 and 0.47, and R-values around 0.5). The relative paleointensity was determined using different normalization parameters to detect concentration and grain size effects. NRM normalized by IRM and susceptibility shows coherent results. However, the sediment shows a strong dependence on magnetic mineral concentration. This effect was successfully removed by using the ARM for normalization, because it reflects the magnetic mineral concentration best. Furthermore, the directional data were obtained by the characteristic remanent magnetization using a principle component analysis with regard to the mean angular deviation less than 3°. Due to the good agreement of all three records, we provide a high resolution stacked record for paleointensity and directional data for Switzerland.