



Sediments of Lake Vens (SW European Alps, France) record large-magnitude earthquake events

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A multi-proxy study was conducted to test the paleoseismic archive potential of lake sediments in the particularly earthquake sensitive area of the SW Alps (Tinée Valley, Lake Vens, 2331 m). The historical earthquake catalogue shows that moderate to strong earthquakes with intensities of IX-X have impacted the Southern Alps during the last millennium. Sedimentological (X-Ray images, grain-size distribution), geochemical (major and TOC %) and magnetic (anisotropy of magnetic susceptibility) analyses show that the Lake Vens sediments consist of a terrigenous silty material sourced from the watershed (minerals and organic matter) and of diatom silica-rich frustules. In addition, the combination of X-ray images, grain size distribution, major elements and anisotropy of magnetic susceptibility shows the presence of six homogenite-type deposits interbedded in the sedimentary background. The sedimentological features of these deposits are ascribed by several authors to sediment reworking and grain sorting by seiche phenomena due to strong earthquakes. The presence of microfaults cross-cutting the sediment strengthens the hypothesis of co-seismic deposits in this system. The chronology is provided by ^{210}Pb measurement and five AMS ^{14}C ages. According to this chronology, the two most recent homogenite events could be attributed to the most damaging historic events dated at AD 1887 and AD 1564 AD. Hence, the Lake Vens sediment record appears suitable to record large magnitude earthquakes and permits to estimate the recurrence time of such large events in the region at ~ 420 years.