

Upper Holocene palaeoclimate and
palaeoenvironment from Mongolia :
calibration of GDGTs, dung fungal spore
and pollen records for Ayrag Lake
(Akhanghai, Mongolia)

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Our understanding of variations in climate and vegetation throughout the upper Holocene is biased by several parameters of the sedimentary record and the proxies used. That is why it becomes important to focus on multi-proxy studies with robust calibrations. This is especially the case for the steppe-forest ecotone that characterises the northern part of the Khangai range in Mongolia. This mosaic of taiga mountain forests, mountain meadows of *Carex spp.* and Poaceae herbs, and *Artemisia spp.* steppes is affected by precipitation and livestock grazing impact as well. This study addresses the calibration of pollen, spores of coprophilous fungi and glycerol dialkyl glycerol tetraethers (GDGTs) by comparing a global calibration derived from the literature with regional surface samples. We collected 52 modern samples (moss polsters, soil and surface sediments) along local vegetation in order to perform calibrations for mean annual air temperature (MAAT), mean annual precipitation (MAP) and vegetation cover (VC). Then we applied the new and global calibrations to a 3800 year cal BP sediment record from Ayrag Lake (Arhangai, Mongolia). This study assesses the relevance of a regional proxy calibration compared to a global one, and the impact these different calibrations can have on the interpretation of past variations. The results will be pertinent to our understanding of the dynamics of human impact throughout the Mongols pastoralism history ; the correlation between the production of branched-GDGT, isoprenoid-GDGT and lesser-known OH-GDGT and H-GDGT molecules with soil composition, vegetation cover and climate parameters, the steppe pollen response to climate variation and the dung fungal spores response to grazing development during the upper Holocene.