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Mediterranean perennial snowfields and ice bodies on the brink of extinction. The story of Mount Olympus, Greece

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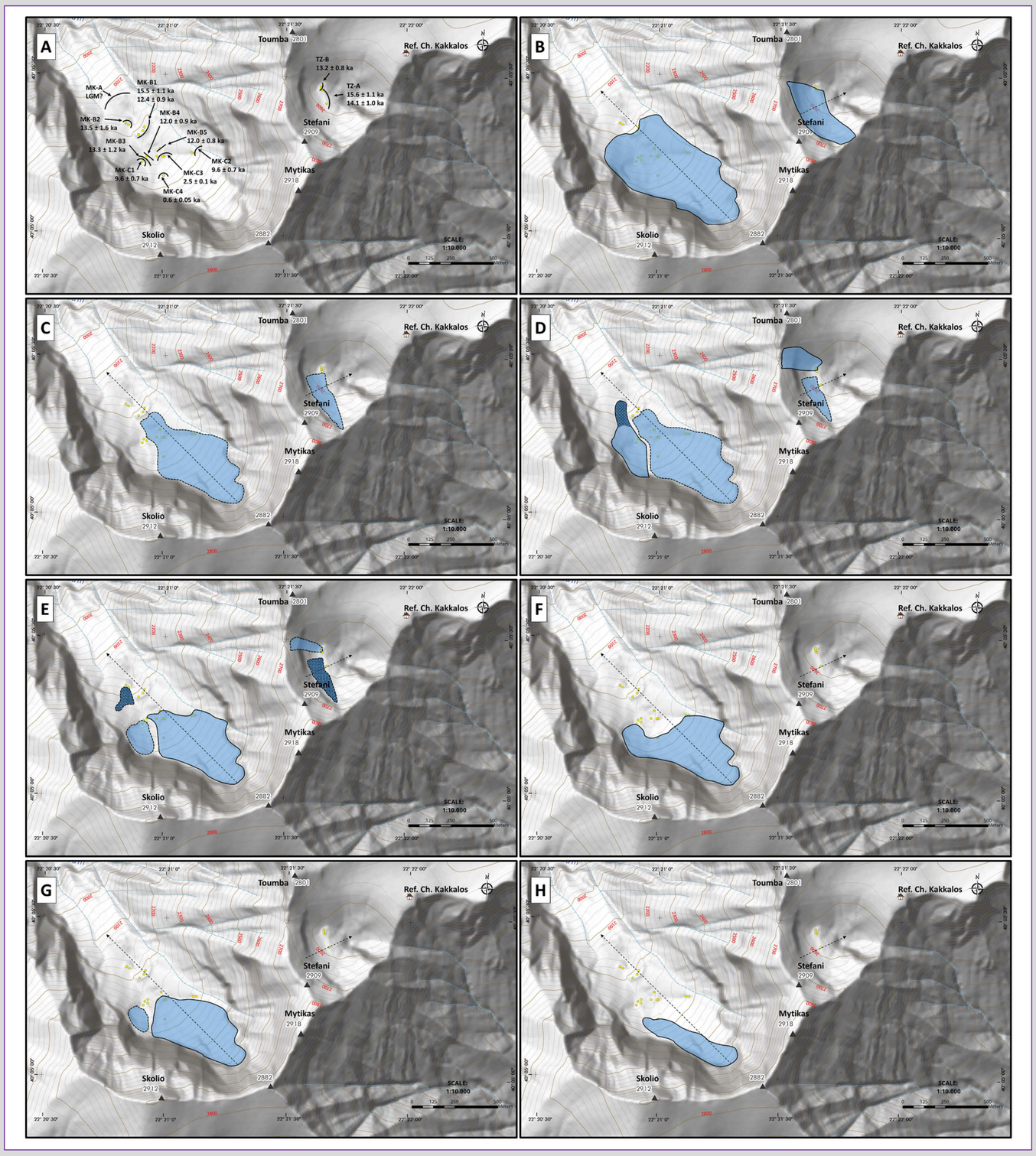
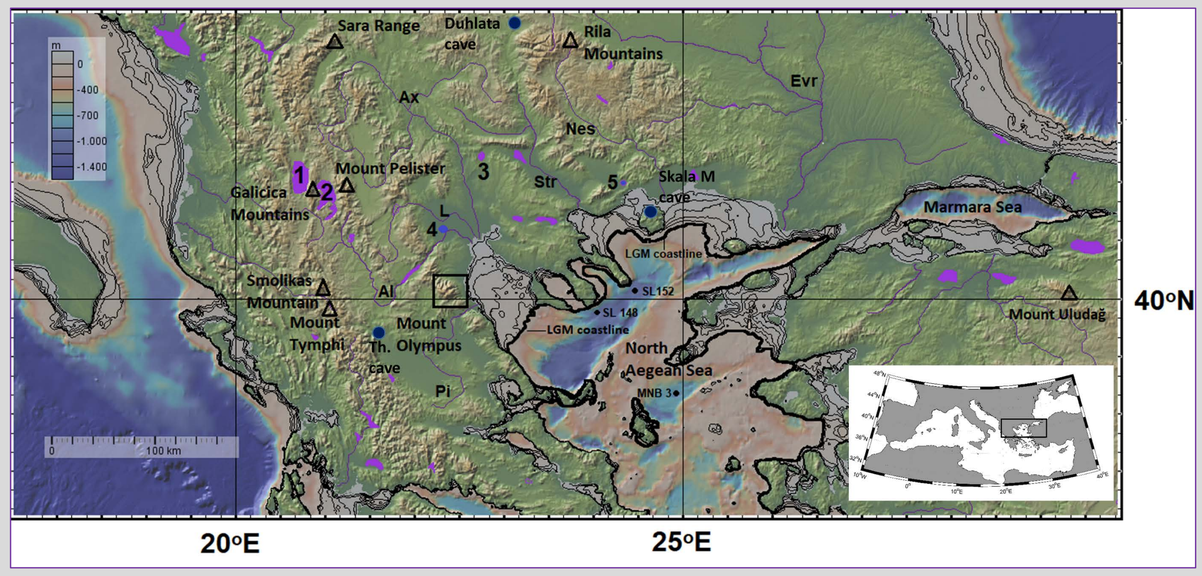
Abstract

In the broader context of rapid environmental and climatic changes in the Mediterranean region, a new ^{36}Cl nuclide glacial chronology from two small (0.5km^2) cirques on Mount Olympus in Greece (Throne of Zeus and Megala Kazania) is presented, spanning the Lateglacial and the Holocene. The new chronology contemplates few existing Surface Exposure Datings (SED) from cirques in the southern Balkan Mountains. Cirque glacier behaviour and solar radiation are *out-of-phase* during the Lateglacial and *in-phase* during the Holocene. The most recent glaciation episode occurred during the Little Ice Age (LIA) and has been confined only in the sheltered northwest facing cirque of Megala Kazania (MK), which is characterized by steep 500m-high headwalls and by large amounts of windblown and avalanching snow. Perennial snowfields and permanent ice bodies survived within the MK cirque during the entire 20th century, despite the fact that the local ELA has been situated above Mount Olympus summit (2918m). Since 2010, pronounced shrinking of the snowfields has led to the exposure and melting of the basal ice, bringing them on the brink of extinction, due to reduced snowfall and increasing summer temperatures. The last ice of Mount Olympus, is preserved within vertical caves, guarding the last climatic information of the Ancient Greek Gods.

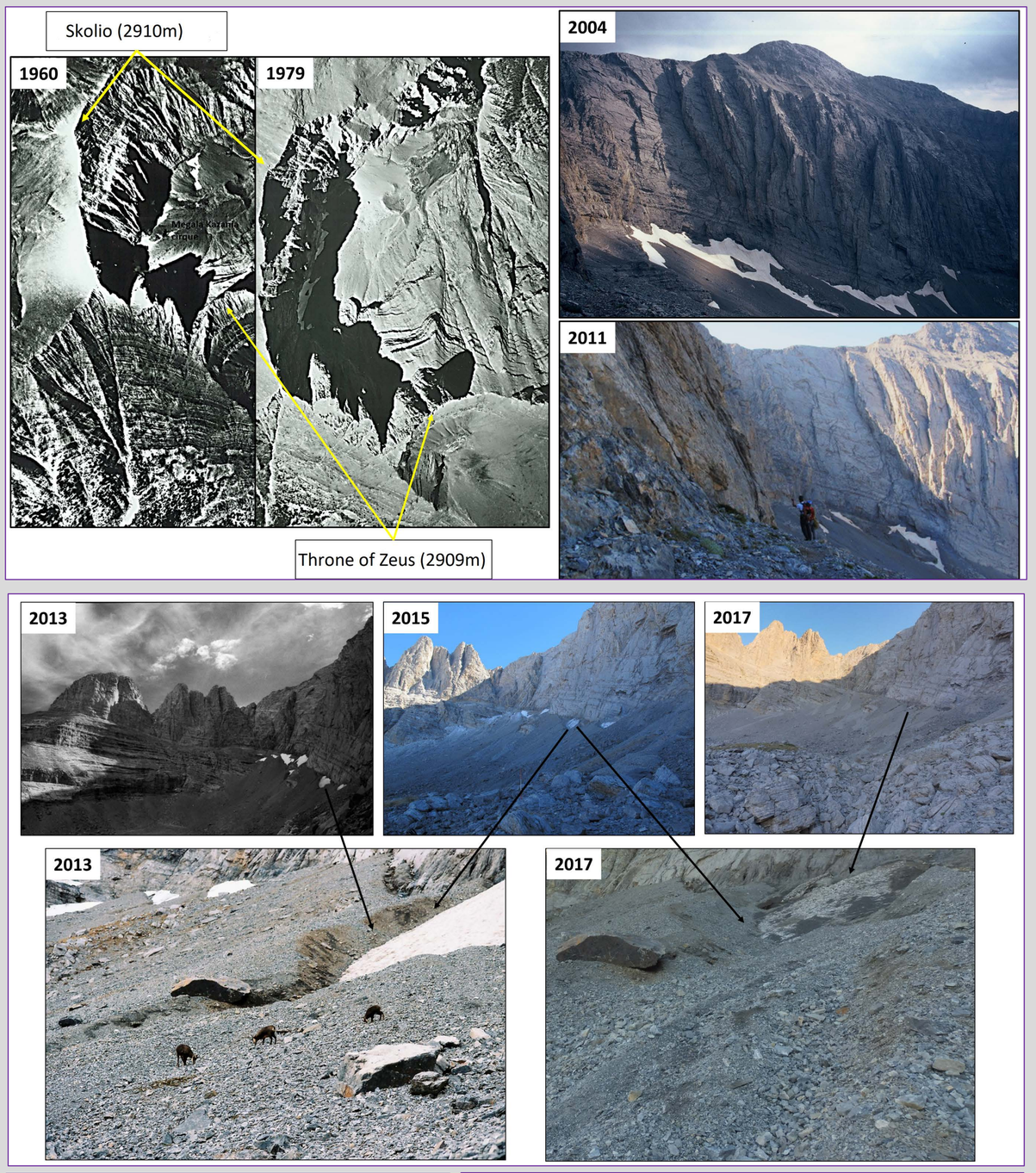
Lateglacial and Holocene glacial evolution of Mount Olympus

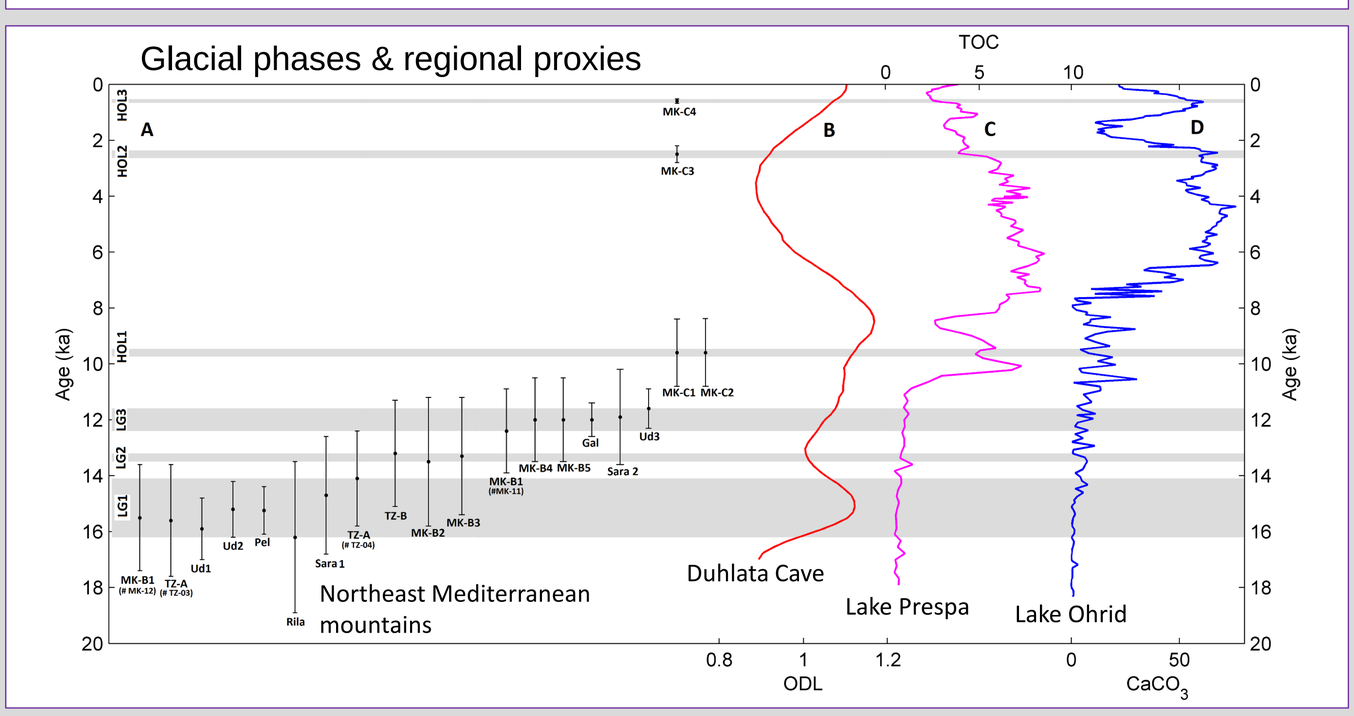
Six phases of glacial activity based on ^{36}Cl cosmogenic datings of 20 boulder samples (A). LG1: early Lateglacial expanse (B) and retreat (C). LG2: shift to periglacial conditions and deposition of protalus rampart (D). LG3: change in glacier thermal regime with cold based margins and deposition of hummocky moraines (E). HOL1: Early-Holocene standstill. HOL2: Late-Holocene glacier expansions (G) during the Iron Age. H: LIA small glacier expansion close to cirque walls



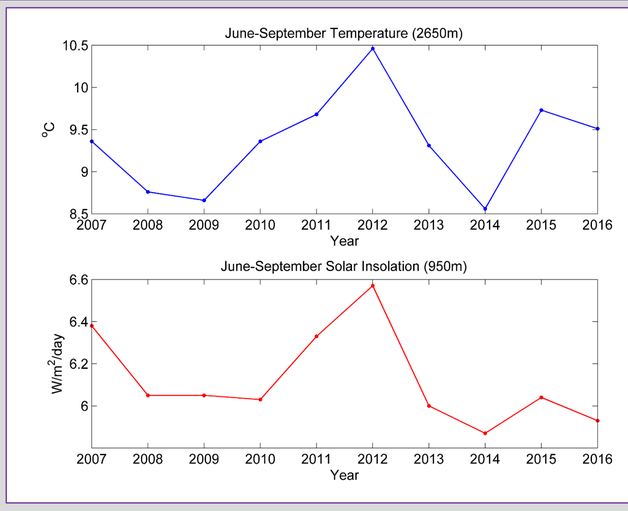


Mid-to late 20th century perennial snowfields and ice bodies: Wet winters – cool summers: 1960 – 1980 & 2000 – 2010. After 2010, increasingly dry winters and warmer summers





At present the summer (June - September) insolation is coupled with temperature (direct measurements), as was the case for the Holocene. This relationship largely controls the snowfields' melting rates. The Lateglacial decoupling between solar insolation and glacier behavior is yet to be defined.



References:

Styllas M., Schimmelpfennig I, Benedetti L., Ghilardi M, ASTER Team, **2018.** Contemplating the Lateglacial and Holocene glacial history of the northeast Mediterranean mountains, with a new ^{36}Cl nuclide chronology from two small cirques on Mount Olympus, Greece. To be submitted in *Quaternary Science Reviews*.