

Hydroclimate of the Tarim Basin, western China, during the past millennium:

Clues from the deep desert

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Lamont-Doherty Earth Observatory

20 March 2013

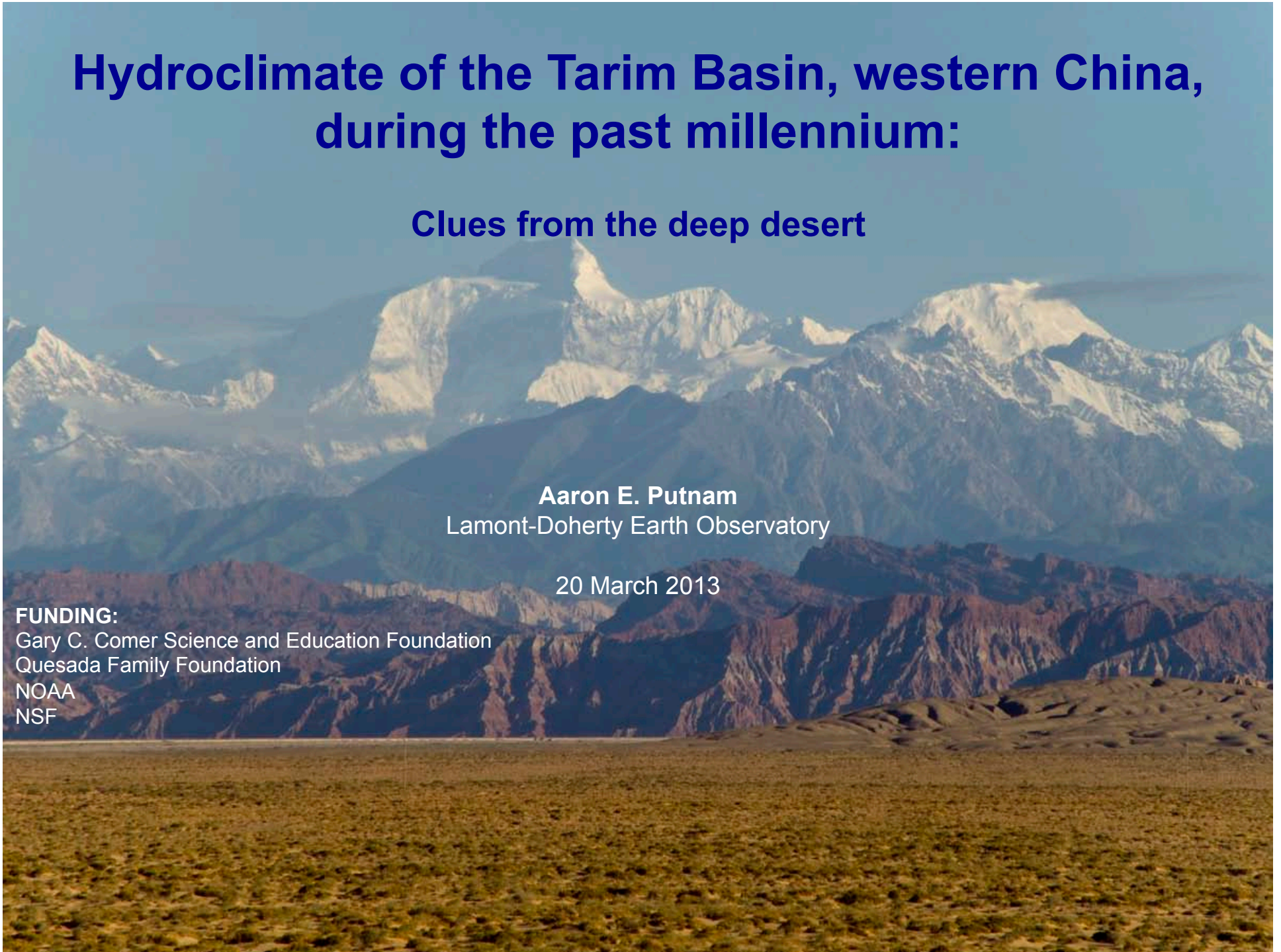
FUNDING:

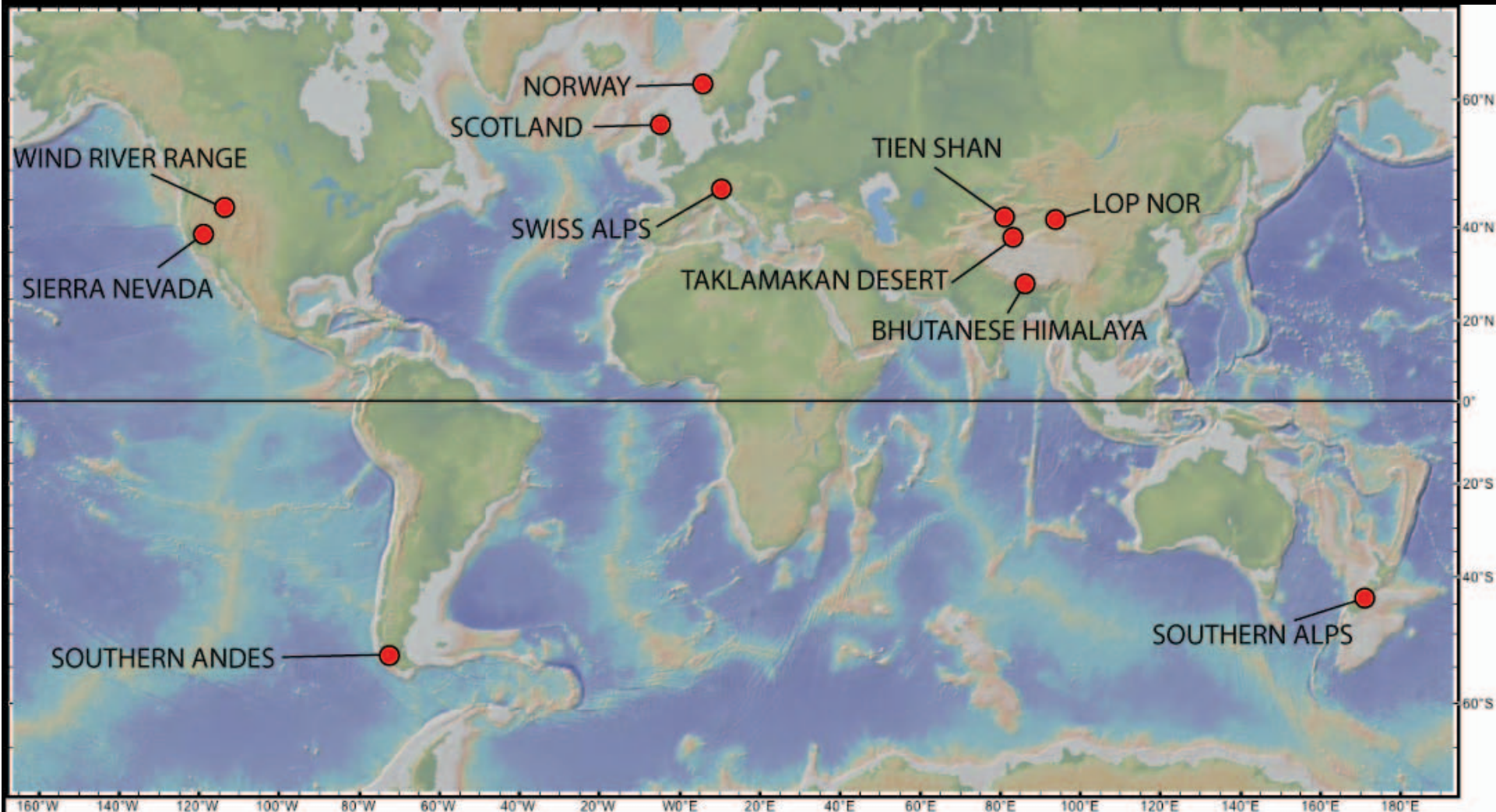
Gary C. Comer Science and Education Foundation

Quesada Family Foundation

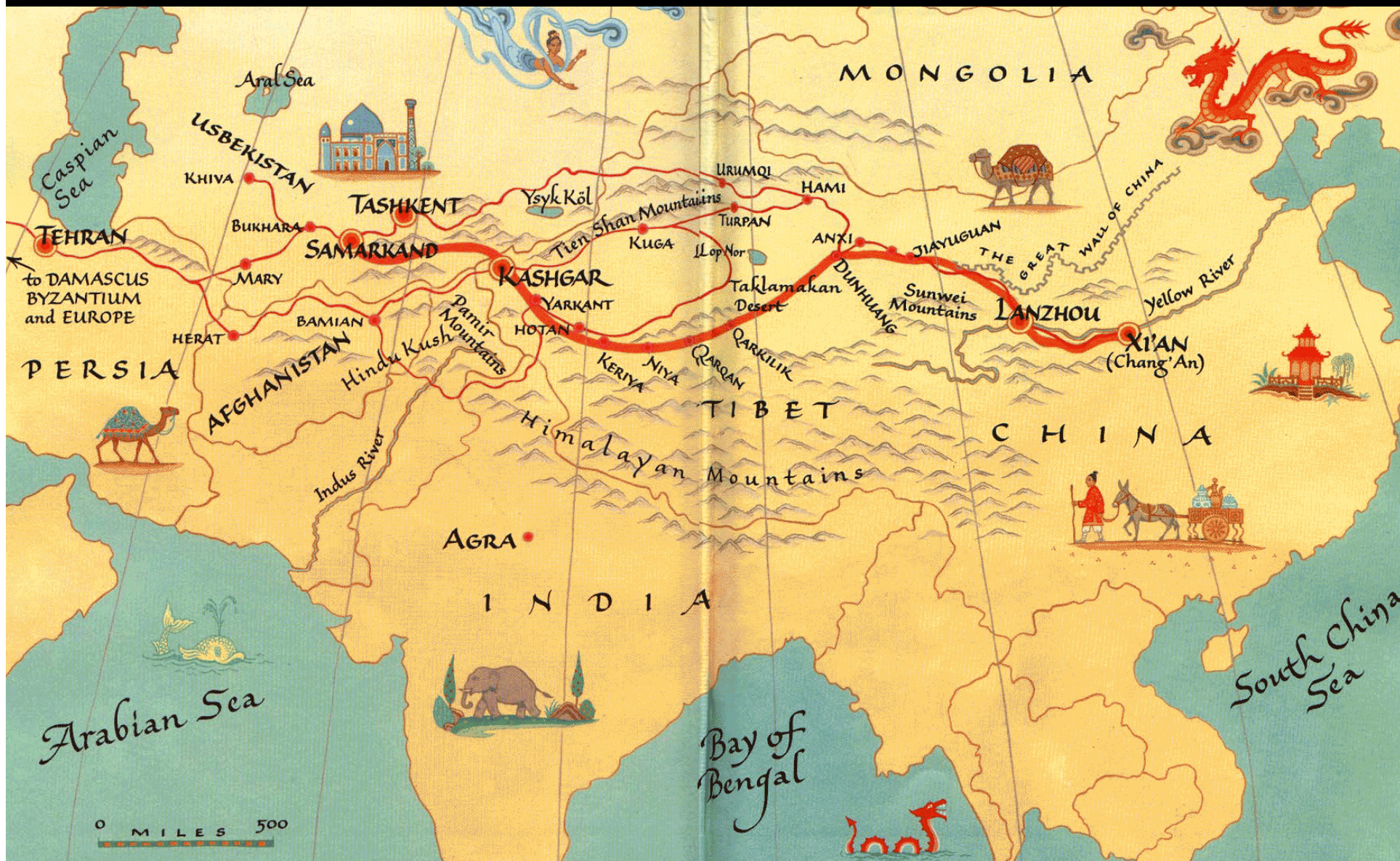
NOAA

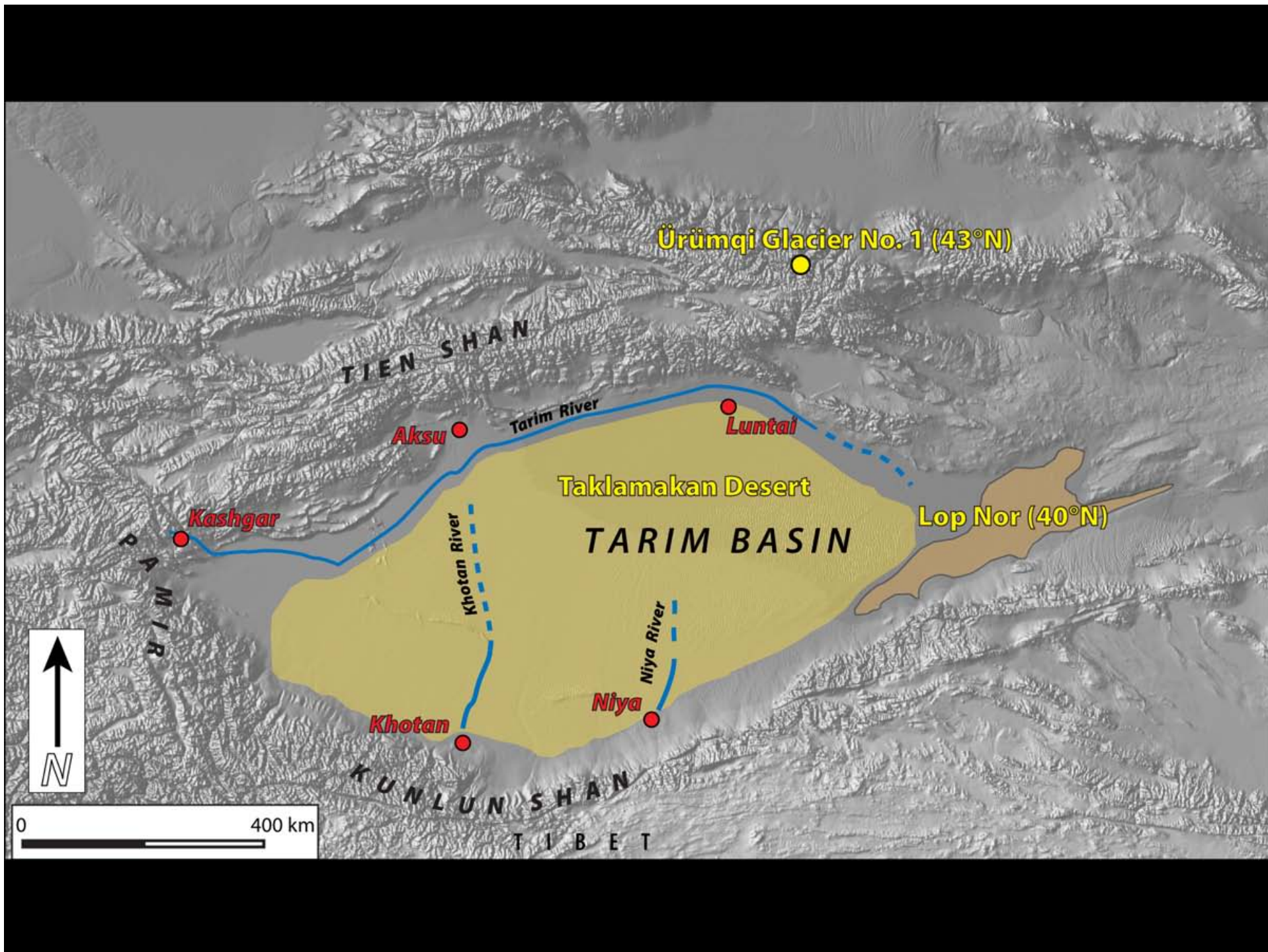
NSF

































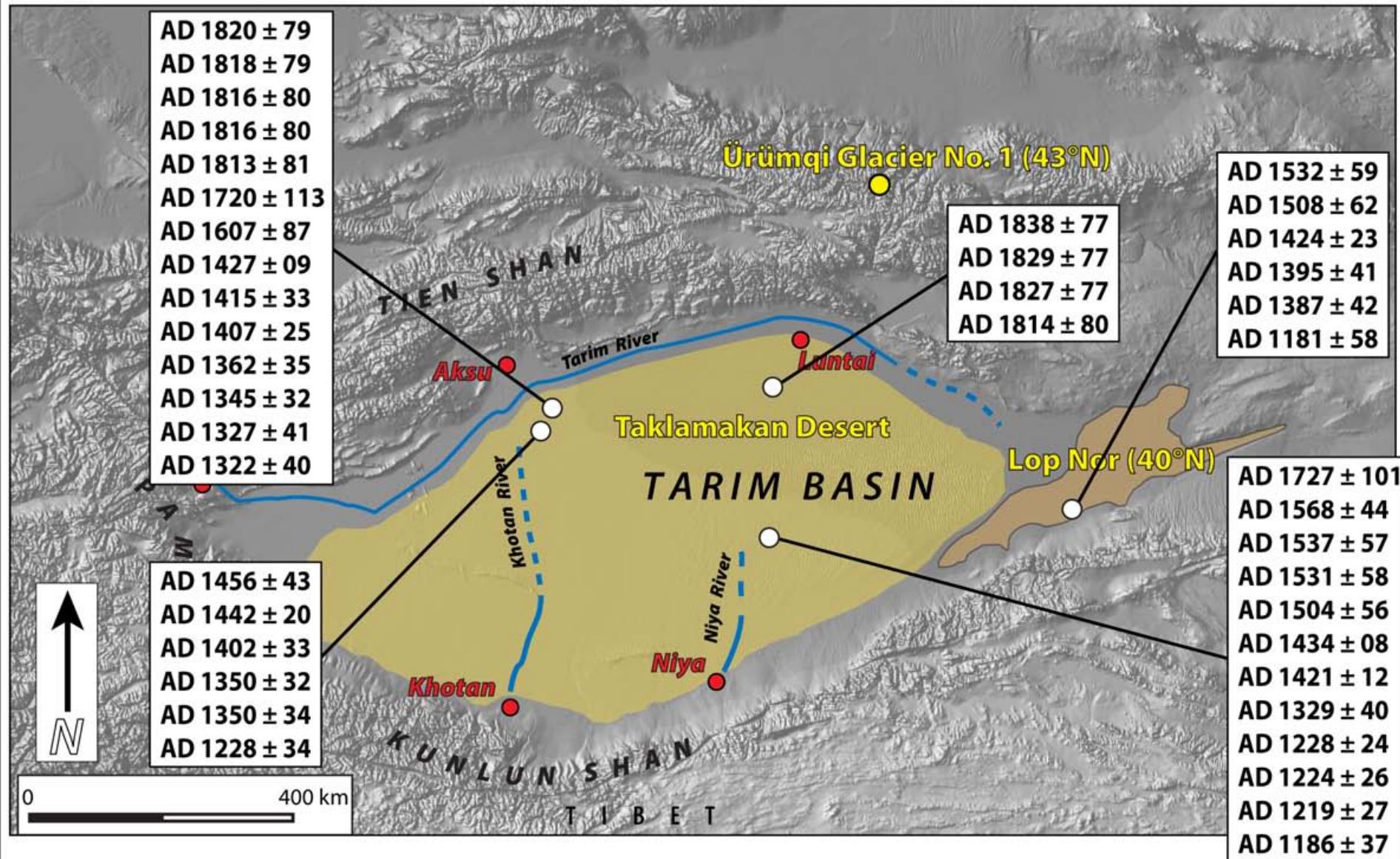














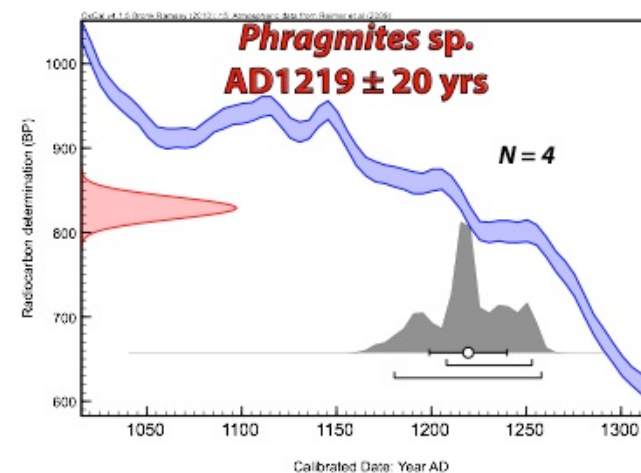
Phragmites sp.

AD 1228 $\pm$ 24 (ETH-46148)

AD 1186 $\pm$ 37 (ETH-46614)

AD 1219 $\pm$ 27 (ETH-46613)

AD 1224 $\pm$ 26 (ETH-46614)

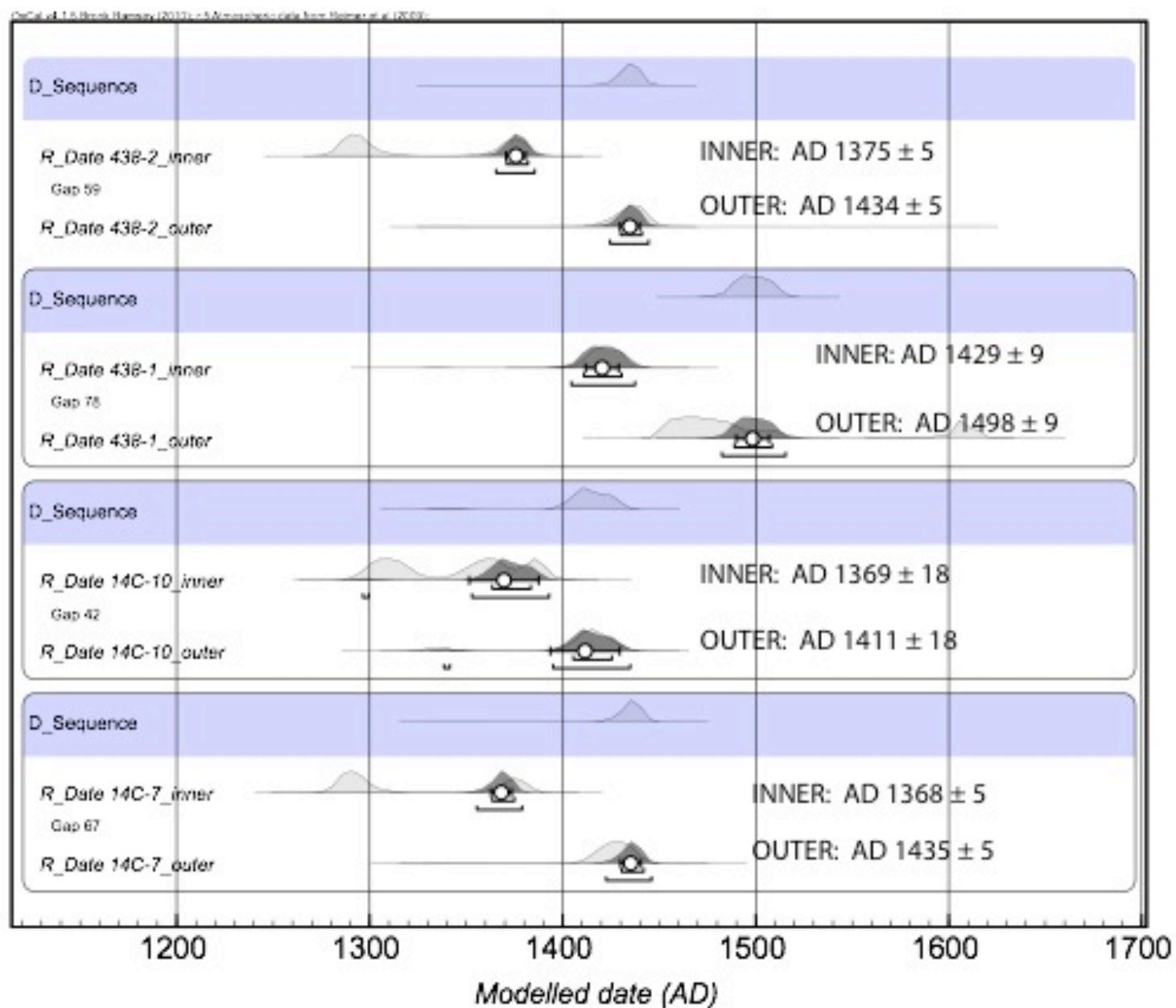




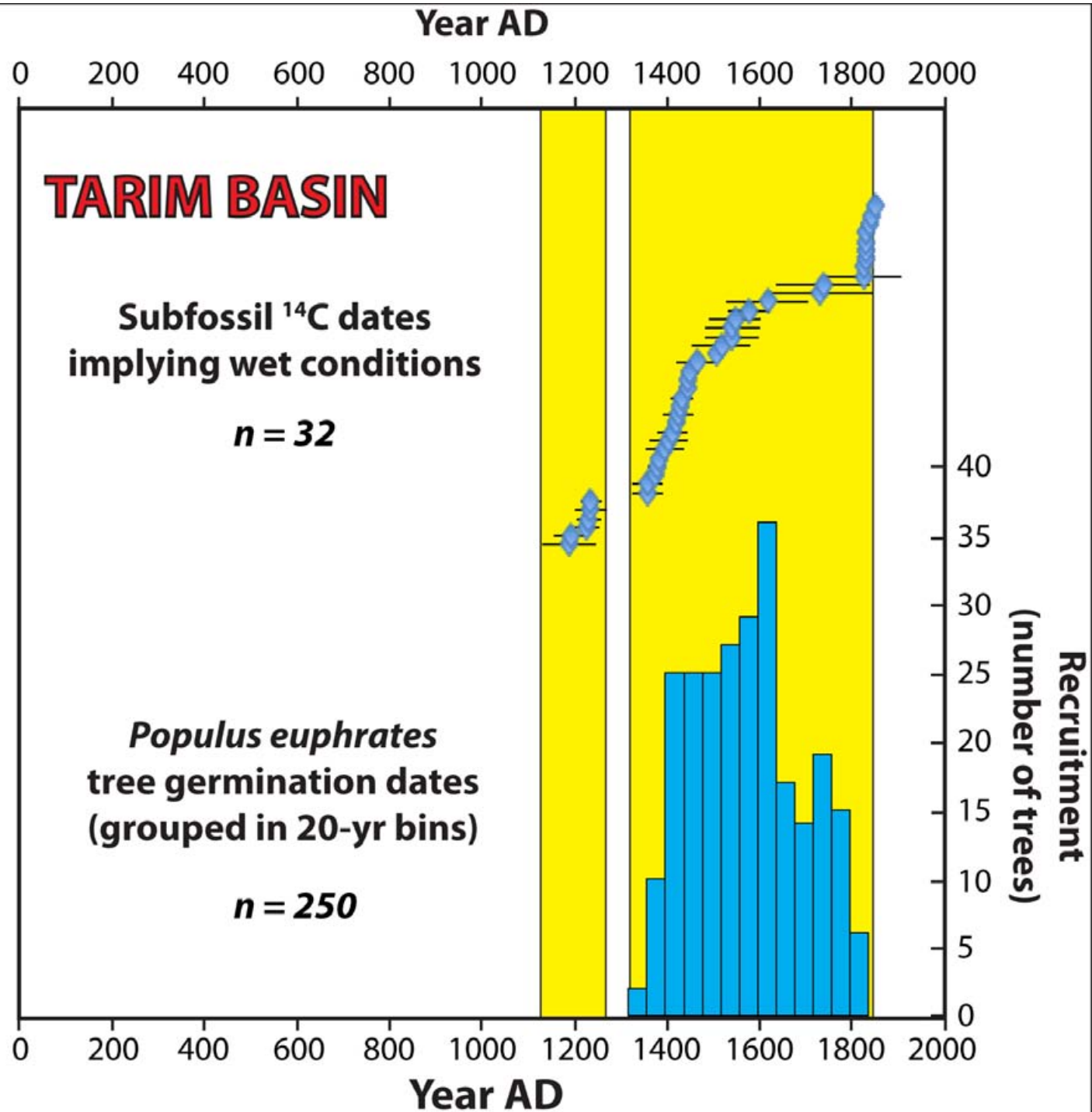


42 growth rings

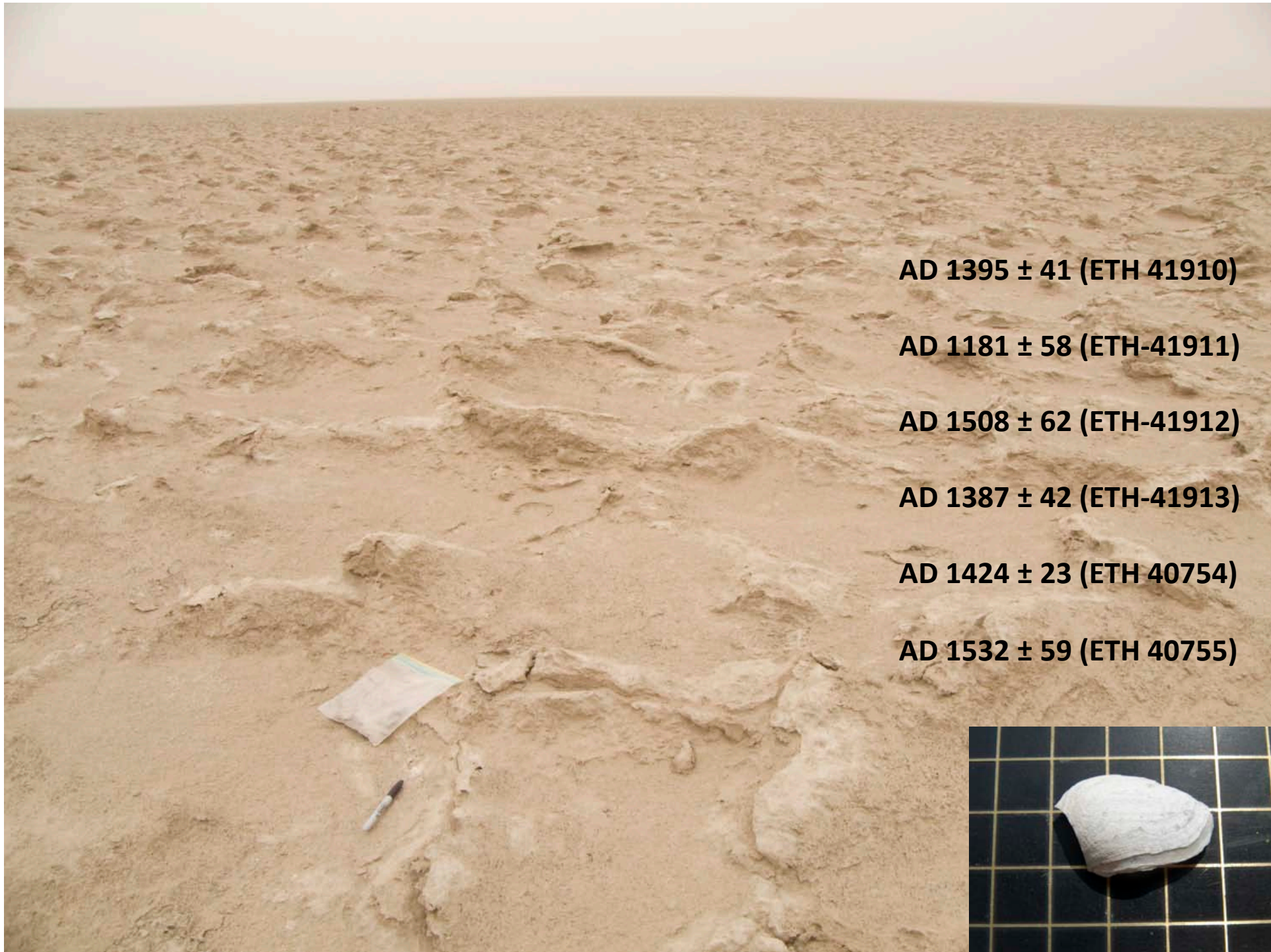
Dendro-¹⁴C dating of subfossil *Populus* trees











AD 1395 $\pm$ 41 (ETH 41910)

AD 1181 $\pm$ 58 (ETH-41911)

AD 1508 $\pm$ 62 (ETH-41912)

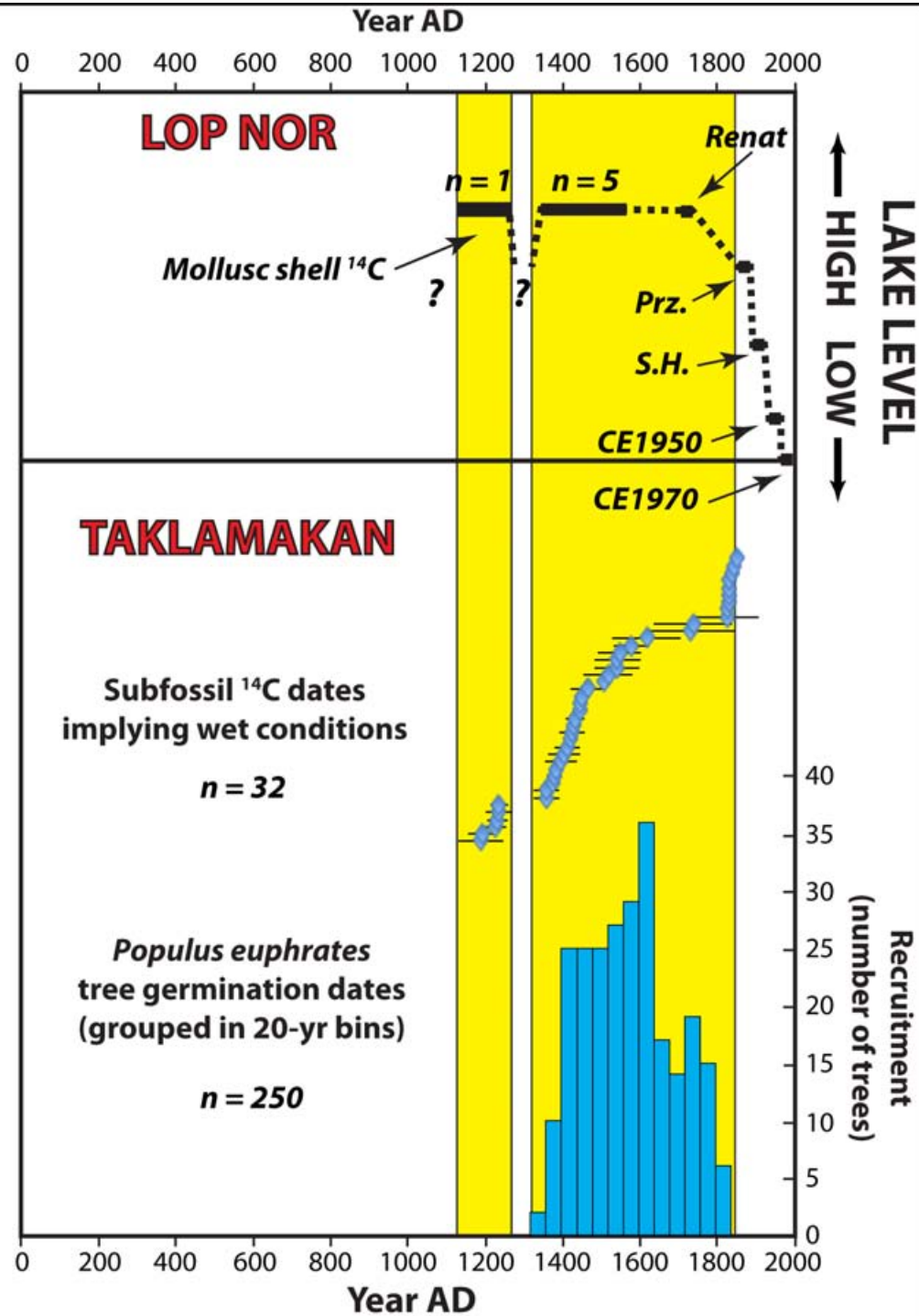
AD 1387 $\pm$ 42 (ETH-41913)

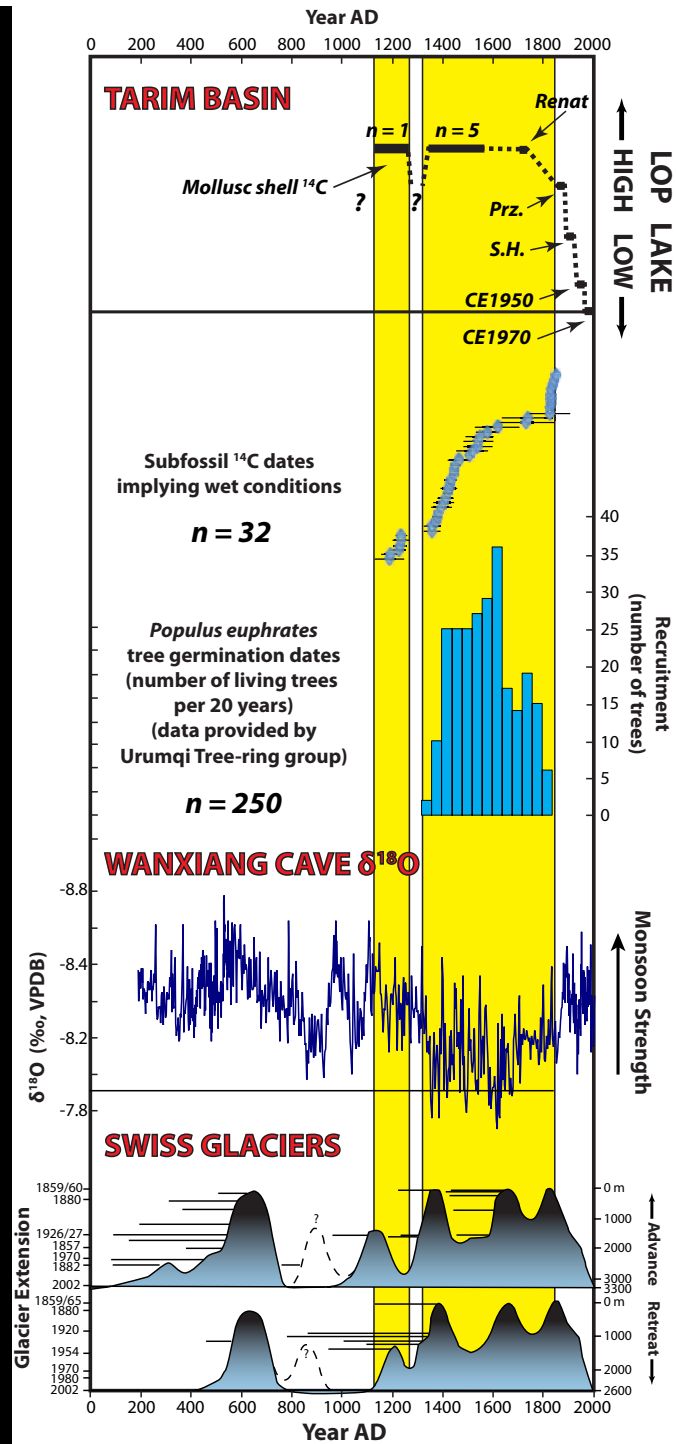
AD 1424 $\pm$ 23 (ETH 40754)

AD 1532 $\pm$ 59 (ETH 40755)





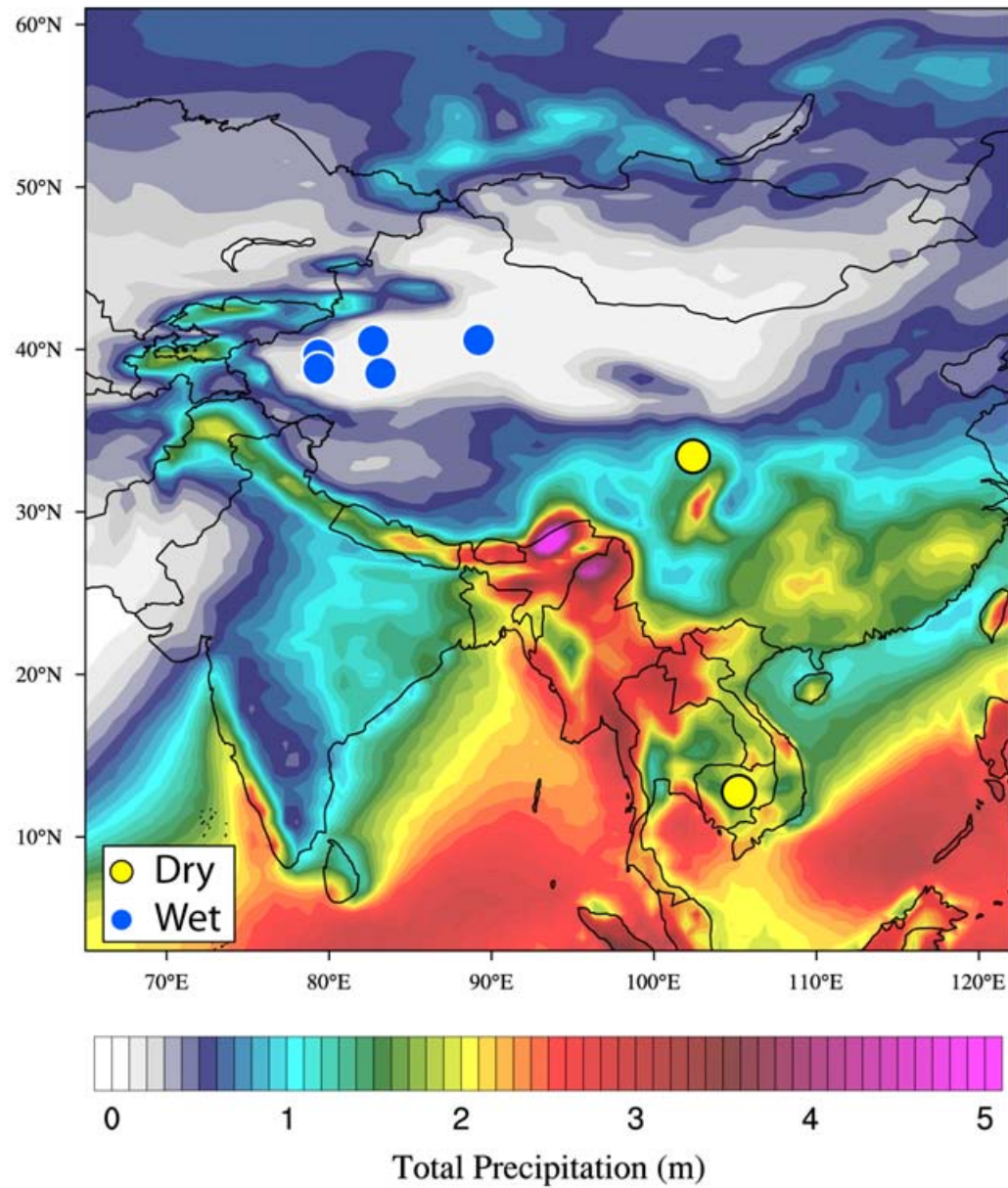




"LIA" vs. present day

ERA-Interim

Annual 1979-2012 Average







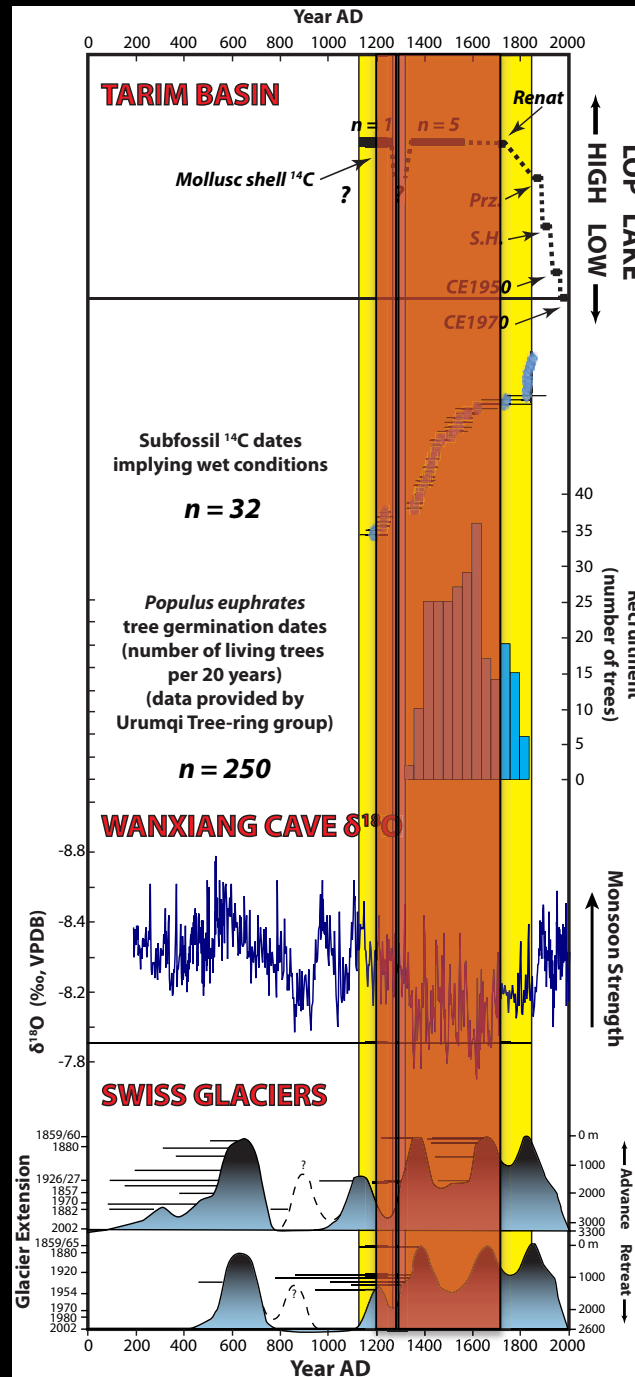
Mongol Empire (Genghis Kahn – Kublai Kahn)

AD 1206 – 1294

Mongol Successors
(Ilkans, Golden Horde, House of Chagatai,
Timurids, Turkic Uzbeks, Moguls,
Crimean Tatars, Zuungars)

AD1294 – AD1750





?? 2000 1999 1998 1997

1996 1995 1994 1993 1992 1991 1990 1989 1988 1987 1986 1985 1984 1983 1982 1981 1980

1979 1978 1977 1976 1975 1974 1973 1972 1971 1970

1969 1968 1967 1966 1965 1964 1963 1962 1961 1960

1959 1958 1957 1956 1955 1954 1953 1952 1951 1950

1949 1948 1947 1946 1945 1944 1943 1942 1941 1940

1939 1938 1937 1936 1935 1934 1933 1932 1931 1930

1929 1928 1927 1926 1925 1924 1923 1922 1921 1920

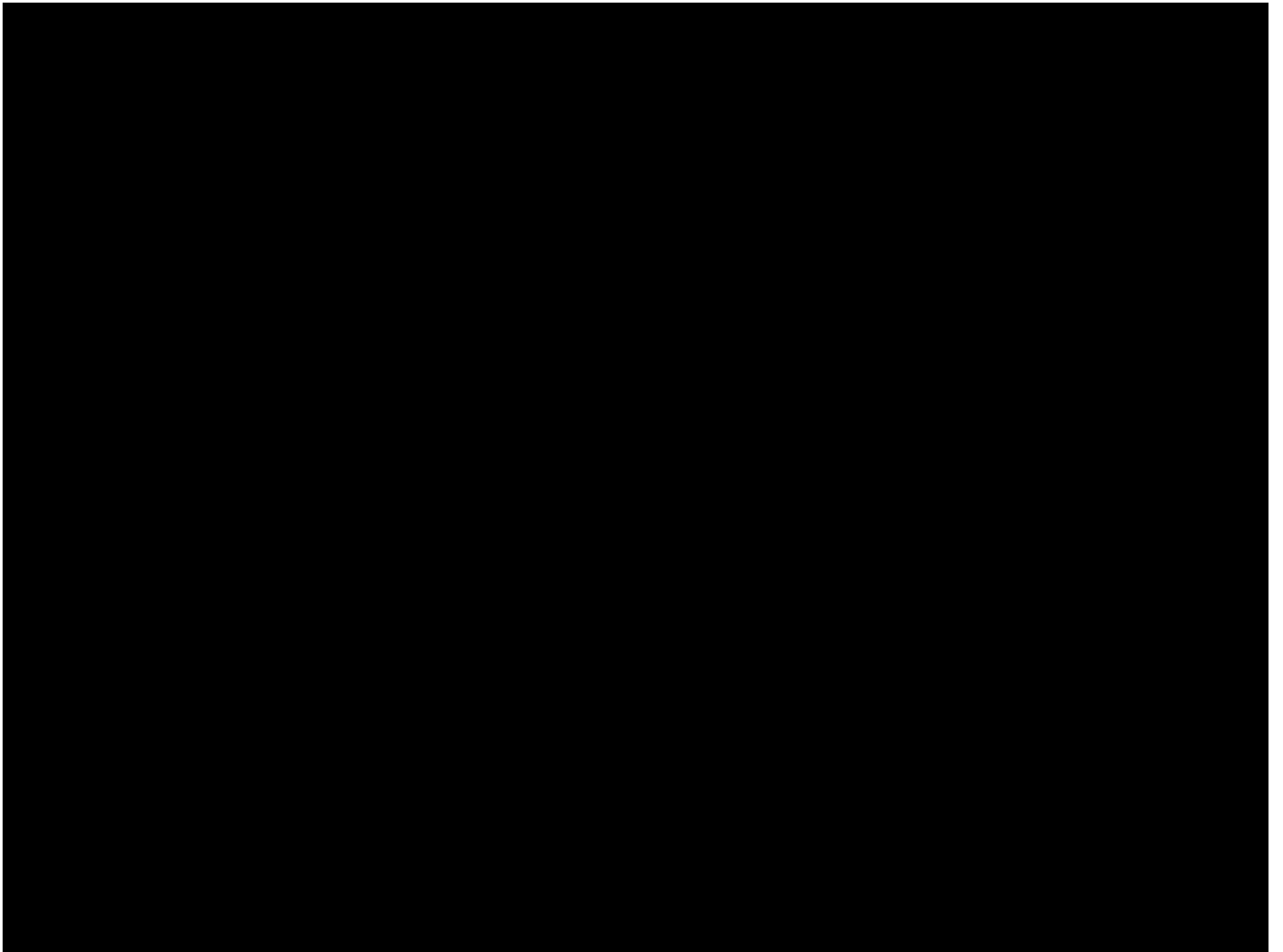
1919 1918 1917 1916 1915 1914 1913 1912 1911 1910

















Sierra Nevada (38°N)

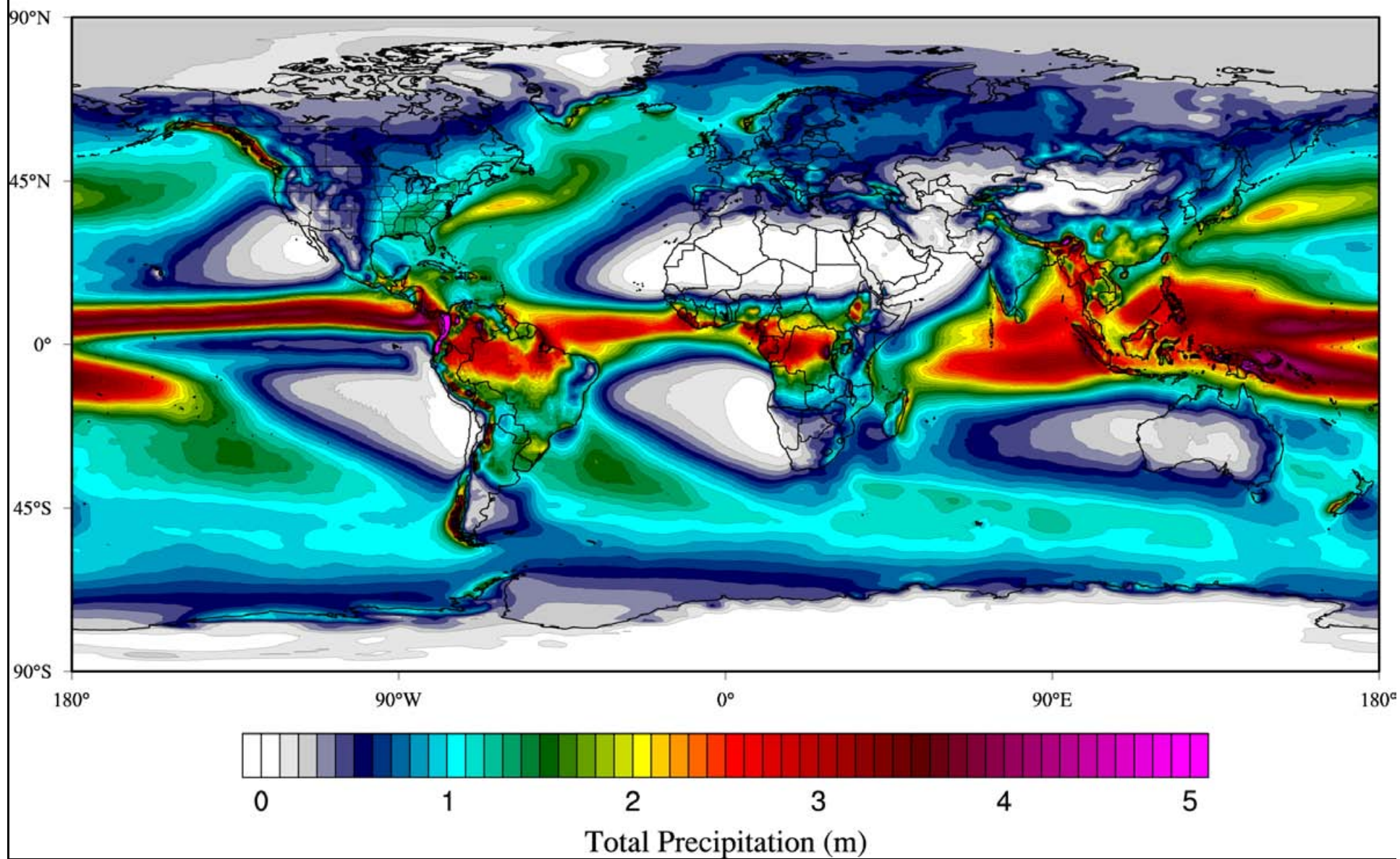


Taklamakan Desert (43°N)



ECMWF ERA-Interim Reanalysis

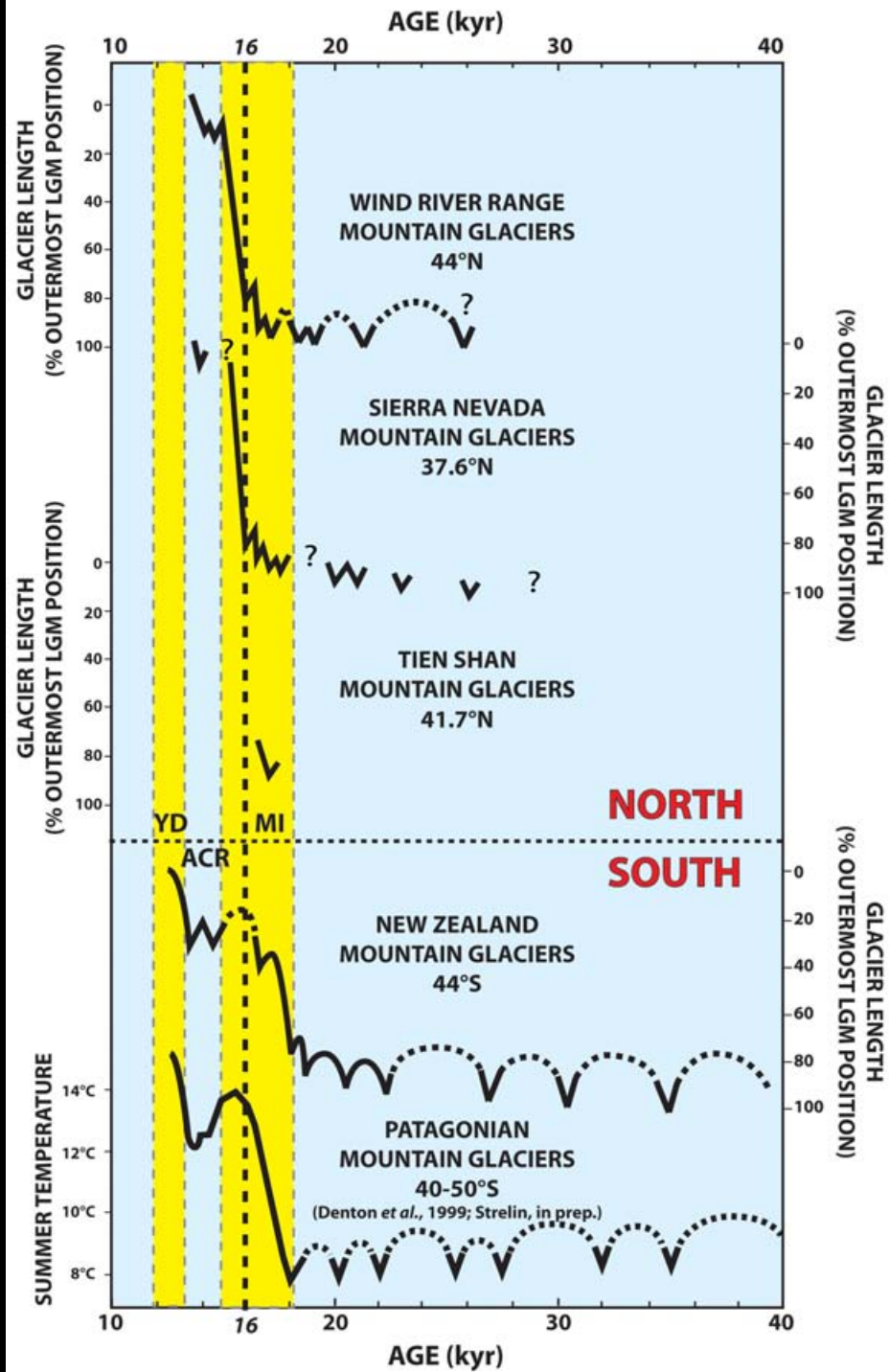
Annual 1979–2011 Average









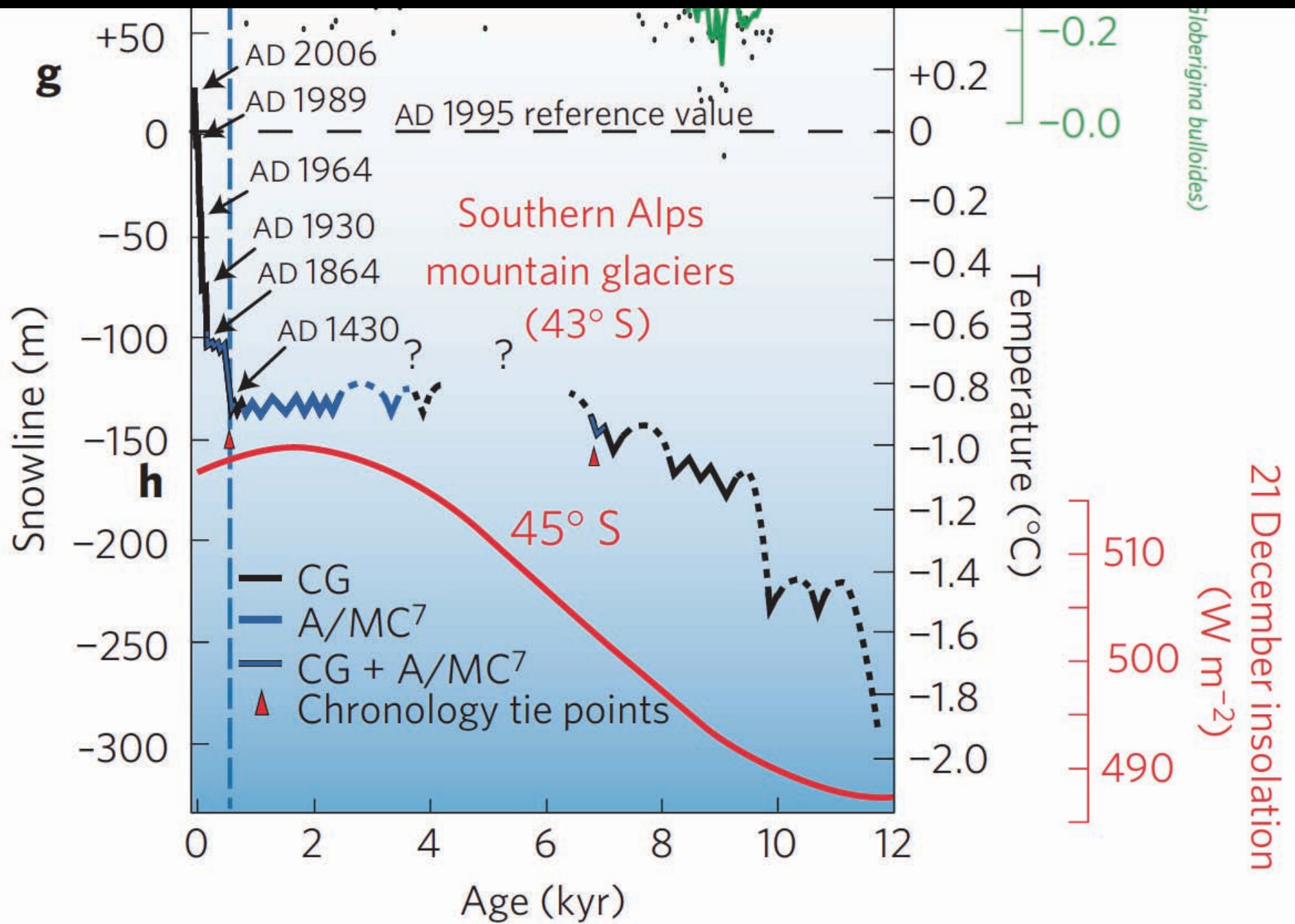


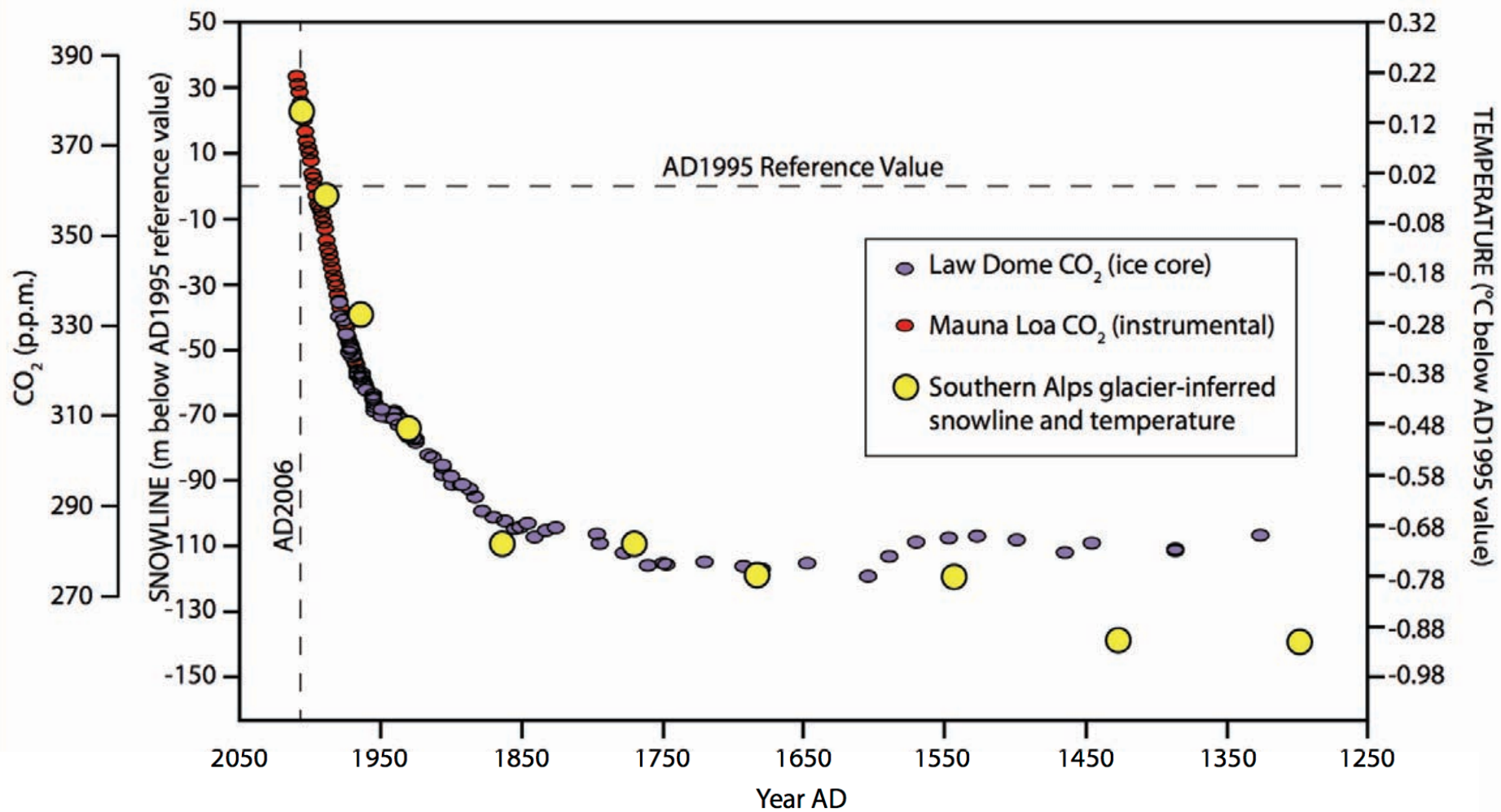














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