# Winter precipitation and temperature constrain distribution of cedrus plants

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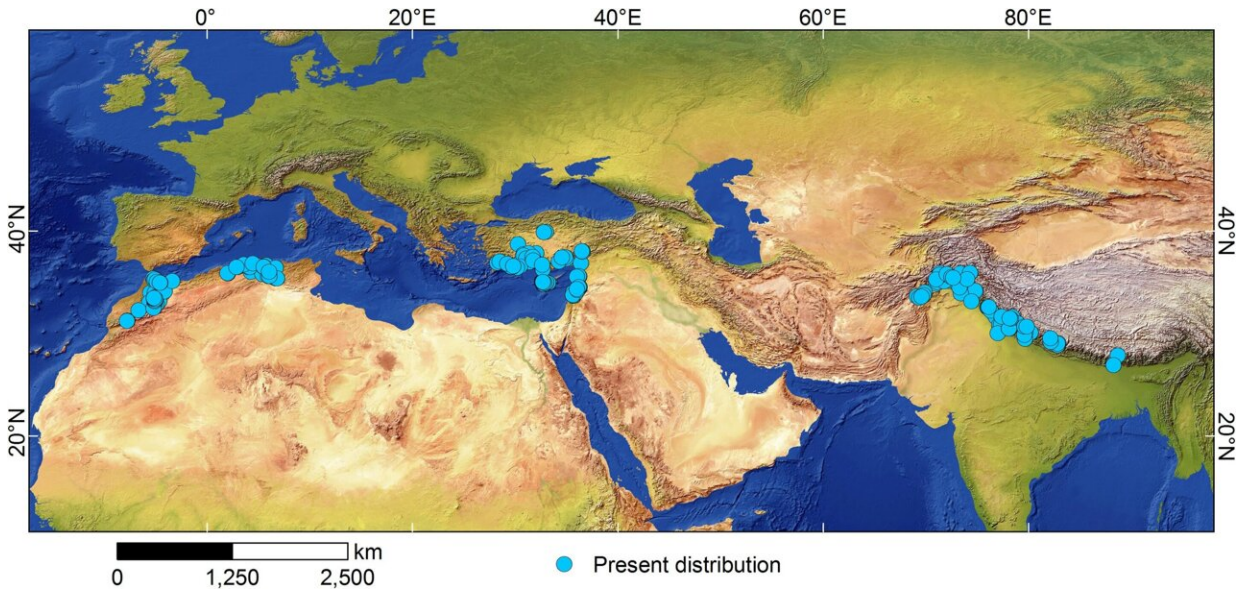


The modern original distribution (native range) of Cedrus in the Mediterranean and western Himalaya. The blue dots represent the distribution of Cedrus [Data from the Global Biodiversity Information Facility (GBIF)]. Credit: *Ecological Indicators* (2022). DOI: 10.1016/j.ecolind.2022.109159

The genus Cedrus Trew (Pinaceae) compromises four species of evergreen coniferous trees, which have important cultural, aesthetic, scientific and economic values. The four species are disjunctively distributed in the Mediterranean region and western Himalaya. Understanding the historical distribution of Cedrus and the driving

factors can provide valuable information for the conservation of these species.

In a study published in Ecological Indicators, researchers from the Xishuangbanna Tropical Botanical Garden (XTBG) of the Chinese Academy of Sciences used the MaxEnt (maximum entropy) model, in combination with climate data and the current distribution data of Cedrus to simulate the past, present and future distribution of potentially suitable habitats for Cedrus in the Mediterranean region and western Himalaya.

The models used in the study have highlighted the key bioclimatic variables that affect the natural distribution of Cedrus. The main climate variable that influences the survival and distribution of Cedrus was winter precipitation. Winter temperature was another important factor controlling the distribution of Cedrus in both areas, and the threshold possibly ranges from -10 °C to 5 °C.

The simulation results showed that the present distribution of suitable habitats for Cedrus was somewhat larger than the actual distribution area. Some locations in the Mediterranean and western Himalaya are far beyond the current distribution of Cedrus. The Quaternary pollen record for Cedrus in the Mediterranean region indicated that Cedrus produced a large amount of pollen that was transported over long-distances.

Moreover, distribution of Cedrus would be reduced in response to global climate change in the future. From the Last Glacial Maximum to future, the distribution of Cedrus in North Africa has decreased significantly, compared with the eastern Mediterranean region.

"We suggest priority be given to the protection of Cedrus in the Mediterranean region. Some measures should be implemented to protect the natural distribution of Cedrus as soon as possible," said Li Shufeng

of XTBG.

**More information:** Shumei Xiao et al, Cedrus distribution change: past, present, and future, *Ecological Indicators* (2022). DOI: 10.1016/j.ecolind.2022.109159