

The delayed expansion of forests in Southern Caucasus

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In Western and Central Europe, the forest expansion began during the Late-Glacial and amplified at the onset of Holocene in most regions. In Eastern Europe and Western Asia, especially in the Black Sea region, the afforestation is not synchronic with Western Europe. Based on pollen records, the rise of forest and/or hygrophilous vegetation occurred more than 3 millennia after the Holocene onset. This delayed forest expansion, as well as its forcing factors, are still controversial.

To enhance this debate, we propose to compare four pollen records from the Southern Caucasus: the palaeolake of Nariani and the Lake Paravani (Messenger et al., 2013), located in Georgia, and the Zarishat and Vanevan wetlands, located in Armenia (Joannin et al., 2014; Leroyer et al., in press).

Since these sequences have not been collected in similar environments, the pollen records deliver different vegetation histories. However, all dynamics present a major change occurring between 9000 and 7700 cal. BP and corresponding to the end of an arid and steppic phase. A new phase marked by the expansion of forest or hygrophilous vegetation took place at that time. The origin of the delayed expansion of forests is discussed in the light of paleoecological information provided by these four sequences and other regional records. While some palaeoclimatic reconstructions show a wet Early Holocene (earlier than 8500 cal. BP), it seems that precipitations were not distributed in spring, limiting the forest development. The connection of the Black Sea with the Mediterranean probably played a major role in the nature, quantity and rhythm of rainfall, but it is still challenging to draw the precipitation pattern and its influence on the forest expansion at that time.

- Joannin et al., 2014. Vegetation, fire and climate history of the Lesser Caucasus: a new Holocene record from Zarishat fen (Armenia). *Journal of Quaternary Science* 29, 70-82.
- Leroyer et al., in press. Mid Holocene vegetation reconstruction from Vanevan peat (south-eastern shore of Lake Sevan, Armenia), *Quaternary International*, In press.
- Messenger et al., 2013. Late Quaternary record of the vegetation and catchment-related changes from Lake Paravani (Javakheti, South Caucasus). *Quaternary Science Reviews* 77, 125-140.