



Aliwen

Impact of environmental and developmental conditions on wood formation dynamics of cordilleran cypress, an endemic tree species of Patagonia threatened by global change

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Summary —

Context — The Cordilleran cypress is a native conifer species from Patagonia growing over a wide geographical distribution range. Patagonia is facing at the same time by a strong warming —mainly caused by the effect of the ozone hole on the regional climate— and a significant reduction in the amount of annual precipitation. These changes are affecting Cordilleran cypress forests, which exhibit high tree mortality and large stand decline, all over their distribution area.

Objectives — In the Aliwen project, we propose to monitor the xylogenesis of Cordilleran cypress in order to better assess its sensitivity and detect early signs of decline. In particular, we will address the question of the influence of the environmental conditions (mesic vs dry sites), climate variations (contrasted growth years) and individual development (male vs female trees) on wood formation dynamics.

Approaches — During four austral growing seasons, from 2018 to 2022, we took weekly microcores in dominant and healthy trees from the *Cerro Runge* site, a closed, mixed and uneven forest of Cordilleran cypress, growing on a hill near San Carlos de Bariloche (Patagonia, Argentina). Each year we selected about 20 cypress: divided between male or female and mesic or xeric plots. About 1,100 microcores have already been collected during the three previous growing seasons. Additionally, home-made point dendrometers were installed in 2018 on four female trees of the mesic plot.

Expected results and impacts — Preliminary investigations during the first campaign have demonstrated the feasibility of the project. We are continuing the sampling over the 2021-2022 austral growing season, since the climatic conditions appear particularly hot and dry compared to previous years. In the Aliwen project, we want to investigate how environmental factors affect xylem formation and resulting tree-ring structures and wood functions, and specially adaptation to water stress in cold environment. These results will contribute to better understand the mechanisms of drought-induced mortality in the Cordilleran cypress.