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The dendroclimatic proxies from the northern Quebec taiga in the PAGES 2K network: recent advances and future developments.

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Northeastern North America was historically underrepresented in the network of climate proxies used for climate reconstructions over the last two millennia. Indeed, in North America most high-resolution climate proxies are long tree-ring chronologies but, in Northeastern North America, these chronologies are highly challenging due to short tree longevity, high frequency and severity of wildfires and remoteness of many areas. Here, we will present the efforts accomplished during the last decade by our team in developing millennial-long tree-ring chronologies in the northern Quebec taiga. We sampled black spruce [*Picea mariana* (Mill.) B.S.P] subfossil tree remains naturally fallen in the littoral zone of six lakes to build six site-specific ring-width chronologies as well as two chronologies of stable isotope ratios (δ^{18}O and δ^{13}C in tree-ring cellulose). These chronologies, which are now included in the PAGES 2K network, were independently used to reconstruct summer temperature variations showing a well-expressed Medieval Climate Anomaly and the impact of volcanic and solar forcings at regional scale. We will also discuss non-climatic influences on these chronologies (i.e. wildfires and sampling height inconsistency), as well as the ongoing effort to extend the reconstructions in time to cover the last 2500 years. Finally, a new European funded project called MAIDEN-SPRUCE will be introduced. Within MAIDEN-SPRUCE, we will use a data-model approach to improve our understanding of the links between forests and climate over the last millennium. More specifically, we will adapt the process-based ecophysiological model MAIDENiso to investigate factors influencing the growth and underlying biogeochemical processes of black spruce. One of our objectives is to provide the first multi-proxy (ring widths and δ^{18}O and δ^{13}C in tree-ring cellulose) regional climate reconstruction in Eastern North America over the last millennium taking into account mechanistic rules, including nonlinear or threshold relationships.