
Palynological responses around the Gulf of St. Lawrence to the North Atlantic Preboreal Oscillation and 8.2 cal ka cold events

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An examination of post-Younger Dryas (YD) pollen stratigraphies in the Gulf of St. Lawrence and St. Lawrence estuary region reveals features in the pollen records that represent breaks in the normal vegetation succession, widespread vegetation suppression, and a delay in migration of plant taxa between 9.7 and 7.2 ¹⁴C ka (11.2 and 8.0 cal ka). The domination of *Alnus crispa* at sites bordering the St. Lawrence estuary-Gulf region in Gaspésie and northern New Brunswick represents a diversion from the typical vegetation progression from *Picea* and/or *Populus* or *Picea/Betula* to *Pinus* and/or *Betula*, and signifies a shift to a cooler, drier climate. Coinciding with the *Alnus crispa* expansion in that region were other signals of cooling, viz., the contraction and replacement of *Picea* populations by the first appearance of tree birch, *Betula papyrifera* in southwestern New Brunswick and eastern and southeastern Nova Scotia, and by a resurgence of shrub birch, *Betula glandulosa*, in western and southwestern Newfoundland where it is reliably dated at 9720 ± 110 ¹⁴C BP (10,800–11,240 cal BP). This first post-YD episode of widespread cooling is correlated with the North Atlantic Preboreal Oscillation. Sites exposed to winds from the Gulf of St. Lawrence in eastern New Brunswick, Prince Edward Island, and northern Nova Scotia show a lingering persistence of *Picea* and delay in arrival of *Pinus* to 8.0 and 7.7 ¹⁴C ka (9.0 and 8.4 cal ka), yet *Pinus* was dominant as early as 9.4 ¹⁴C ka (10.6 cal ka) in southwestern New Brunswick. At the same time, tundra vegetation persisted at high elevations in western and southwestern Newfoundland only to be replaced by upslope migration of shrub-birch heath by 8 ¹⁴C ka. Prolonged broad-scale-cooling to 8 ¹⁴C ka and to as late as 7.7 ¹⁴C ka extended up to 200 km inland in areas exposed to the St. Lawrence estuary and Gulf region and was in response to strong, cold, dry anti-

cyclonic winds coming off the retreating Laurentide Ice Sheet in combination with enhanced freshwater runoff through the Gulf of St. Lawrence.

Several sites document a subsequent cold shift, that interrupted regional warming at 7650 to 7200 ^{14}C BP (8400 to 8000 cal BP), and which is variously represented by the suppression of *Pinus* and resurgence of *Picea*, sometimes with *Alnus crispa* (Québec-Maritime region), or by an abrupt decrease of *Picea* and resurgence of *Betula* (western Newfoundland). This second post-YD cool interval is equated with the 8200 cal BP cold event registered in the Greenland ice isotopic record.