



Temporal and spatial correlations between Canada basin opening and the Brookian orogeny

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The opening of the Canada Basin (CB) is currently a matter of debate both in terms of timing of inception (between 190 and 140 Ma) and mechanisms. Contrasting models were published, in which the CB is bounded by extensional margins and transform faults with a wide variety of combinations. The structure of the margins (and the detailed chronologies of the different events affecting them) are thus of prior importance to discriminate between the different models. Its North-Alaskan margin comprises the Brooks Range, which results from the collision of the Koyukuk island arc with the continental margin of Northern Alaska subducted toward the south.. Most recent palinspastic models assume that the CB opened in a back-arc position (with a rotation pole located as close as in the Mackenzie delta) during a change of polarity of the overall subduction, from a S-dipping to a N-dipping Pacific-type subduction. However, neither the detailed timing of the Brookian orogeny (between ~160 and 100 Ma) nor the existence and timing of the hypothesized subduction flip are precisely constrained.

According to present knowledge, one can only say that the CB opening seems broadly coeval with the Brooks range orogeny. Improved chronological constraints are thus needed for the Brooks range, as well as indications as to whether (1) their inner structure witnesses a drastic change in boundary conditions during this period and (2) structures responsible for the exhumation of the inner parts of Brooks Range are compressional (i.e. syn-collisional nappe-stacking) or extensional (i.e. post-collisional extensional detachment). Improving our knowledge of the Brookian orogeny may also help to constrain possible geodynamic scenarios on a larger scale and identify driving mechanisms for the CB opening.

Our thermal evolution (RSCM) study along a regional transect of the Alaskan peninsula associated with field observations and the contribution of numerical models gives independent constraints and suggests that no such drastic change of boundary conditions occurred during the exhumation of the inner parts of Brooks Range. U-Pb dating of zircons from Brooks range eclogites, which are under way, will help to constrain the early « Brookian » orogenic history (namely the initial collisional stage and its duration) and help constrain the scenarios of CB opening and forces driving it.