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# : Integrating lithosphere deformation into plate kinematic models for the Arctic

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The timing and kinematics of the opening of the Arctic Ocean, including the Amerasia Basin, remain one of the most contentious regional issues in plate tectonic reconstructions. Various plate motion models have been proposed, leading to vastly different implications for regional extension and compression through time. There are approximately 140 sedimentary basins within the circum-Arctic, many of which have recorded lithospheric extension or compression from the Jurassic to recent geological history. The detailed kinematic evolution of many remote basins is not well known, but different types of sedimentary basins typically result in different geometries and sediment accumulations. We present a new methodology to use the geometry and infill of sedimentary basins to help to construct a regional kinematic model consistent with the sedimentary basin constraints. We attempt to differentiate different tectonic scenarios from each other. Using crustal data, sediment thickness models, mapped rigid tectonic blocks in conjunction with dated deformation events, we evaluate competing alternative plate models. Using the open-source plate kinematic modelling software GPlates, we generate a prototype of a deforming plate model for the Russian and Canadian margins.