

Estimates of Current Plate Motions around the Bering Sea and Northeast Asia Based on GPS Measurements

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The location of the boundary between the North American and Eurasian plates in northeast Asia has long been subject to considerable uncertainty. The two plates diverge at spreading centers in the North Atlantic and Arctic Oceans, and converge in northeastern Asia. Because the pole of relative plate motion is located in the same area, relative plate motions are slow and deformation may be diffuse. GPS measurements made over the last decade on the Russian and American sides of the boundary show a more complex pattern of present motions. The crust of the Bering Sea and most of Alaska moves significantly relative to stable North America, making it likely that the edge of the undeforming North American plate lies well within North America. A similar pattern holds for northeast Asia. Overall, the region consists of a collage of small microplates or blocks moving relative to each other, with some of the microplate boundaries being uncertain or controversial, and some proposed microplates perhaps being regions of diffuse deformation rather than rigid plates. Here we use new and reanalyzed GPS data to reassess the proposed motion of the Bering plate and its boundaries, including a new microplate model for southern Alaska.