



## Abstract View

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# The Turning Process in Meandering Currents: A Case Study

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### ABSTRACT

As a meandering current changes its curvature vorticity, the lateral shear, the shearing deformation, the vertical shear, and the lateral temperature gradient also change. Changes in these parameters, together with their generating and conversion mechanisms, are called the turning process.

The objectives are first to identify, in a situation where friction is negligible, the pertinent generating and conversion mechanisms generally, and second to assess their relative importance in the turning process for high-speed inertial currents with horizontal meander scales small compared to the radius of the earth. A conclusion is that in the dynamics of these high-speed currents, where vertical motion plays a central role, the beta effect is negligible. Instead, the turning process is dominated by the banking and the divergence mechanisms. The current banks as it turns and converts curvature vorticity to lateral shear vorticity. As a striking consequence of this conversion, the speed axis migrates laterally from parcel to parcel within the current, as curvature and lateral shear vorticities take on opposite signs.

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