



## New constraints of subducted mantle lithosphere on plate-tectonic reconstructions of deformed continental blocks

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Global seismic tomography and earthquake locations are now sufficiently good that many subducted slabs can be mapped in 3D, unfolded and restored to the surface of the Earth, thereby providing important new quantitative constraints on plate-tectonic reconstructions. The size, shape, present horizontal and vertical positions and seismic velocities of subducted slabs provide rich data constraints on plate-tectonic reconstructions of past plate networks into which the deformed continental regions such as Eurasia and SE Asia must fit. Commonly, we find that well-imaged and restored slabs of mantle lithosphere fit together along their edges in approximate “picture-puzzle” fashion, within seismic resolution. The slab edges correspond to plate transforms, slab tears, initial positions of trenches and edges of slab windows. This use of subducted slabs provides for more data-rich reconstructions of lost ocean basins such as those consumed between India and Eurasia and between Southeast Asia and Australia, and thereby constrains deformation of the adjacent continents. We describe our methodologies for mapping and unfolding slabs in Gocad, and using these restored slabs in GPlates. Examples are shown from Taiwan, the India-Asia collision, Southeast Asia, and Greater northeast Australia.