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Transtensional folding

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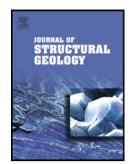
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Transtensional folding

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6	
7	Abstract
8	Strain modeling shows that folds can form in transtension, particularly in simple
9	shear-dominated transtension. Folds that develop in transtension do not rotate toward the
10	shear zone boundary, as they do in transpression; instead they rotate toward the divergence
11	vector, a useful feature for determining past relative plate motions. Transtension folds can
12	only accumulate a fixed amount of horizontal shortening and tightness that are prescribed
13	by the angle of oblique divergence, regardless of finite strain. Hinge-parallel stretching of
14	transtensional folds always exceeds hinge-perpendicular shortening, causing constrictional
15	fabrics and hinge-parallel boudinage to develop.
16	These theoretical results are applied to structures that developed during oblique
17	continental rifting in the upper crust (seismic/brittle) and the ductile crust. Examples
18	include (1) oblique opening of the Gulf of California, where folds and normal faults
19	developed simultaneously in syn-divergence basins; (2) incipient continental break-up in
20	the Eastern California-Walker Lane shear zone, where earthquake focal mechanisms reflect
21	bulk constrictional strain; and (3) exhumation of the ultrahigh-pressure terrain in SW
22	Norway in which transtensional folds and large magnitude stretching developed in the

23 footwall of detachment shear zones, consistent with constrictional strain. More generally,

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