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Spreading break versus slab rollback

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According to recent literature, Phanerozoic orogenic belts, such as the North-American Appalachians, European Variscides, and Palaeozoic orogens in western South America, resulted from collisions of a major plate with ribbon continents consecutively rifted away from the continental plate located at the opposite side of an ocean (Ocean 1). A current idea is that the separation of a ribbon continent from the continental plate starts with subduction of this ocean beneath this plate and the formation of a magmatic arc and, through slab rollback, a back-arc basin. This basin further develops to a new ocean (Ocean 2), the spread of which leads to the travel of the formed ribbon continent to the opposite continental plate. An alternative scenario, stimulated by the slab window hypothesis (Thorkelson 1996, Tectonophys. 255, 47-63), is presented to produce an extensional regime that develops first a back arc basin and then Ocean 2 without slab rollback. During the subduction of Ocean 1 the overlying continental plate is pushed over the upwelling mantle that had generated the spreading center of this ocean. This center is buried beneath the lithosphere of the continental plate and becomes inactive (= spreading break) as basaltic melts cannot form in the upwelling mantle at depths below 50 km or somewhat more. However at such depths the still very hot original spreading center, which is mainly composed of basalt/gabbro, will not turn to eclogite and might be separated from the previously subducted oceanic lithosphere by a slab breakoff process. After the lithosphere with the magmatic arc was pushed over the former spreading center, which is then located beneath thin continental lithosphere, it starts to melt because it is/was continuously heated by the upwelling mantle. The generated melts, which might be variably composed because on top of the basaltic oceanic crust of the former spreading center sediments of different provenance were residing (partially from an accretionary wedge eroded during early burial of the spreading center), ascend to the surface to form a proto-oceanic crust in the back-arc basin. As this process results in thinning of the lithosphere, the upwelling mantle material can rise to produce again basaltic melts and a new spreading center which could subsequently create extended oceanic crust. Thus, the concisely explicated alternative scenario can generate a ribbon continent and a new Ocean 2. Small volumes of alkali-rich melts, such as lamprophyric ones, and melts, related so far to a slab window, could act as tracers of the location of the former spreading center below the thin continental lithosphere during its inactivity or break.