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Mantle uplift and exhumation caused by long-lived transpression at a major transform fault

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Large portions of slow-spreading ridges have mantle-derived peridotites emplaced either on, or at shallow levels below the sea floor. Mantle and deep rock exposure in such contexts results from extension through low-angle detachment faults at oceanic core complexes or, along transform faults, to transtension due to small changes in spreading geometry.
In the Equatorial Atlantic, a large body of ultramafic rocks at the large-offset St. Paul transform fault forms the archipelago of St. Peter & St. Paul. These islets are emplaced near the axis of the Mid-Atlantic Ridge (MAR), and have intrigued geologists since Darwin's time. They are made of variably serpentinized and mylonitized peridotites, and are presently being uplifted at a rate of 1.5 mm/yr, which suggests tectonic stresses. The existence of an abnormally cold upper mantle or cold lithosphere in the Equatorial Atlantic was, until now, the preferred explanation for the origin of these ultramafics.
High-resolution geophysical data and rock samples acquired in 2013 show that the origin of the St. Peter & St. Paul archipelago is linked to compressive stresses along the transform fault. The islets represent the summit of a large push-up ridge formed by deformed mantle rocks, located in the center of a positive flower structure, where large portions of mylonitized mantle are uplifted.
The transpressive stress field can be explained by the propagation of the northern MAR segment into the transform domain. The latter induced the overlap of ridge segments, resulting in the migration and segmentation of the transform fault and the creation of a series of restraining step-overs. A counterclockwise change in plate motion at $\sim$11 Ma initially generated extensive stresses in the transform domain, forming a flexural transverse ridge. Shortly after the plate reorganization, the MAR segment located on the northern side of the transform fault started to propagate southwards, adjusting to the new spreading direction. Enhanced melt supply at the ridge axis, possibly due to the Sierra Leone thermal anomaly, induced the robust response of this segment.