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39-4 - CRUSTAL STRUCTURE ACROSS NORTHERN NEW ENGLAND AND THE ADIRONDACK MOUNTAINS



Tuesday, 19 March 2024



9:00 AM - 1:00 PM



Armory Ballroom (Doubletree by Hilton)

Booth No. 4

Abstract

The Appalachian Mountains are the most prominent feature of Eastern North American geology and record multiple episodes of accretion and subsequent rifting over the last ~0.5 Ga. Trending near north-south, the surficial expression of the Appalachians in New England can be sub-divided into distinct tectonic terranes such as Avalon, Gander, and Moretown, however their lateral limits and nature of lowermost boundaries at depth remain unknown. Recent densely deployed temporary seismological experiments (NEST and SEISConn) have observed a clear step-like increase in bulk crustal thickness from east to west, advancing our understanding of the region's tectonic history. In this study, we present preliminary results using back-azimuthal harmonic regression of multi-taper receiver functions to investigate the crustal structure from the western boundary of the Adirondack Mountains, crossing the suture formed by Appalachian orogenesis, to the Atlantic coast. We present results from both long running permanent stations (TA) and the temporary deployment NEST (2018 – Present). We report a gentler transition in crustal thickness across the Appalachian suture zone in northern New England when comparing to previous studies in southern New England which show clear evidence of a step-like Moho geometry. Additionally, we report evidence of dipping inter-crustal interfaces between the northern Adirondacks and Appalachian terranes likely representing the previously reported Grenville Ramp. We complement our preliminary receiver function results with a synthetic modeling workflow to map both dipping and anisotropic signals observed within the crust. Our preliminary results show a regionally complicated crustal structure across the Adirondacks and northern New England. These results represent first-order observations on the nature of the lower most boundary of the New England crust and will aid in the further investigation of its tectonic history.

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