# Exploring Connections Between Seafloor Topography and the Structure of the Bottom Boundary Layer

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The oceanic overturning circulation re-distributes and stores large amounts of heat and gases, including greenhouse gases, both of which affect the climate of the earth. The bottom boundary layer (BBL), which is the layer of water that directly interacts with the seafloor boundary, plays a significant role in the overturning circulation. All water-mass transformations that decrease the density of deep water and close the overturning circulation occur in these BBLs. To see how topography impacts the structure of the BBL, we studied data from repeated cruises, from 2012 and 2021, in the Northern Atlantic Ocean between the Great Banks and South America. We examined graphs of potential density vs height above seafloor at each station to visually inspect the density gradients. To focus on the BBL, we used only the bottom 200 m of each profile. Based on common gradient structures such as stratification and steppiness, we categorized the profiles into eight groups, and then plotted them on a topographic map. We found strong evidence that BBLs follow spatial patterns that are characterized by the topography of the region. These spatial patterns can be applied to different regions of the ocean and can help create more detailed and accurate climate models. Further research into other factors that influence this pattern such as velocity can help oceanographers improve the categorization and overall knowledge of BBLs.