



Quantifying glassy and crystalline basalt partitioning in the oceanic crust

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The upper layers of the oceanic crust are predominately basaltic rock, some of which hosts microbial life. Current studies of microbial life within the ocean crust mainly focus on the sedimentary rock fraction, or those organisms found within glassy basalts while the potential habitability of crystalline basalts are poorly explored. Recently, there has been recognition that microbial life develops within fractures and grain boundaries of crystalline basalts, therefore estimations of total biomass within the oceanic crust may be largely under evaluated. A deeper understanding of the bulk composition and fractionation of rocks within the oceanic crust is required before more accurate estimations of biomass can be made. To augment our understanding of glassy and crystalline basalts within the oceanic crust we created two end-member models describing basalt fractionation: a pillow basalt with massive, or sheet, flows crust and a pillow basalt with sheeted dike crust. Using known measurements of massive flow thickness, dike thickness, chilled margin thickness, pillow lava size, and pillow lava glass thickness, we have calculated the percentage of glassy versus crystalline basalts within the oceanic crust for each model. These models aid our understanding of textural fractionation within the oceanic crust, and can be applied with bioenergetics models to better constrain deep biomass estimates.