

Bias in the Estimation of the Global Burial Flux of Biogenic Silica due to Incomplete Digestion Using Conventional Alkaline Methods

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Biogenic silica (bSi) burial accounts for ~60% of the total marine Si output flux. Current work suggests that the marine burial flux of bSi is ~9.2 Tmol-Si yr⁻¹, which is 1.5 times greater than the previous estimates. However, this estimate is based on bSi content determined using many different methods (i.e., XRD, XRF, FTIR, ICP-MS and alkaline digestion methods). The lack of an internationally recognized and standardized method taking into account the potential biases associated with sediment type and provenance may potentially bias estimates of the global burial flux of bSi. It is thus necessary to understand the influence of these biases on the measurement of bSi content in marine sediments from a variety of depositional environments. This study compared the bSi content (%) analyzed using some of the aforementioned methods. Our findings demonstrate incomplete dissolution of bSi (i.e. sponge spicules) using conventional alkaline methods. As a result, current estimates of the global bSi burial flux may still be under-estimated, despite recent advances in our understanding of the marine silicon cycle.