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## Hiding in Plain Sight: Searching for Evidence of Subduction on Europa's Icy Shell

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Satellite images from Voyager 1/2 and Galileo indicate that the Jovian moon Europa has a geologically young surface (40-90 Myr) and might host active tectonics within its icy shell. Previous work has interpreted many of the surface features on Europa as evidence of extensional deformation. However, outside the relatively smooth and asymmetric subsumption bands, evidence of compressional topography is very limited. This suggests that compression induced topographic uplift on Europa must be either; a) very diffuse, potentially due to the elastic properties of the ice, b) undetectable in current satellite images due to photogrammetry and resolution limitations, or c) some of the ice mass must subduct below the surface. To investigate this hypothesis, we first calculate the total volume of new ice that is generated at extension bands and rifts for a first order approximation of the expected amount of compressional uplift, assuming icy shell mass conservation and considering isostatic balance. Using the finite element code ASPECT, we will then run visco-elastic-plastic numerical models of subduction to investigate whether any 'missing' topographic signal can result from the subduction of ice and its associated (diffuse) compressional deformation at subsumption bands. Our results have the potential to unravel the mystery of Europa's topography and provide new insights into the tectonics of icy planetary bodies.