

"Solar Superstorm", a new planetarium program, will be shown. It includes a sequence from my simulations of the emergence of magnetic flux through the solar surface. After the show I will present details of my results. The computational domain is 48 Mm (4 Earth diameters) wide extending from 0.5 Mm above the visible surface to 20 Mm below it (covering 10% of the geometrical depth and 2/3 of the stratification of the solar convection zone). A uniform, 1 kG, untwisted, horizontal magnetic field of infinite extent was advected into the computational box by convective upflows in the centers of supergranule-size cells at the bottom boundary. Convective upflows and buoyancy bring the field toward the surface, while downflows push it down, thus producing a serpentine structure of Omega and U loops. As the Omega loops rise, convective motions both shred the field into thin filamentary sub-loops as well as keeping the overall magnetic structure confined to within the largest subsurface convective cells -- supergranule scale (about 30 Mm) in our simulation. The filamentary sub-loops emerge first. The tops of the sub-loops emerge as horizontal fields over granular upflows with their vertical legs in the intergranular downflow lanes. This produces a mixed polarity, "pepper and salt" field pattern. As the larger-scale loop continues to emerge, its top passes into the outer solar atmosphere, leaving behind its unipolar legs which form the bipolar sunspots and active regions.