

GLOBAL SCALE SMALL CIRCLE DEPRESSIONS AND POLAR WANDER ON

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Combined Voyager, Galileo and New Horizons imaging data reveal a series of broad arcuate low-relief small-circle depressions and troughs (SCD's) on Europa, forming two organized antipodal sets of circular concentric lineaments about 45° in radius. These features do not disrupt, and are not disrupted by, other geologic features, and do not fit any known global diurnal tidal stress fields in their current position. A possible mechanism involves formation of extensional troughs primarily due to stresses caused by an episode of ~90° polar wander, followed by ~30° non-synchronous rotation and 30° of rotation about the center of the circles to place the circles in their currently observed positions. The extraordinary depths of some of these depression (>1 km) are inconsistent with a very thin ice shell on Europa.