

## **Apparent tilt angle relaxation during active region evolution can be explained by surface effects**

**Hannah Schunker**

### **Abstract**

Active region tilt angles have been observed to 'relax' towards a more east-west orientation as active regions evolve and this motion has been used to constrain models of flux rising to the surface of the Sun from the deep interior. We tracked the individual motions of the leading and following polarities in over 150 active region polarities (from the Solar Dynamics Observatory Helioseismic Emerging Active Region (SDO/HEAR) survey, Schunker et al. 2016) at the surface during emergence to constrain the dominant physics guiding the polarity motions and tilt-angle onset. We found that the mean north-south motion of the polarities is consistent with the expected displacement due to the Coriolis force acting on the east-west motion of the polarities after flux first appears at the surface. The change in tilt angle due to a purely east-west motion of the polarities plus the change in tilt angle from this north-south separation due to the Coriolis effect can account for the apparent tilt angle relaxation.