# How much solar wind comes from active regions?

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2017 eclipse, P. Aniol, M Druckmüller, S.Gregoire, S. Habbal, Z. Hoder, P. Horálek

#### Open magnetic field



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#### The Sun in EUV





#### **PFSS** modelling





#### Open magnetic field





# Partitioning AR/CH

- Trace (360 x 180) grid of field lines from source surface
- Identify **B**, lat, long of open field
  (→ solar wind footpoints)
- Assume B > 30 G is an active region
- Not perfect, but tractable starting point

(See also Schrijver et al. 2003)



#### **AR open field locations**



#### CH open field locations



L UCL

#### Results





- Different observatories agree well
- At solar max, 40 60% of open flux rooted in active regions
- Strong solar cycle (and CME rate?) correlation

#### Results



- Heliospheric structure of AR solar wind is **very** different for different cycles
- Solar Orbiter + PSP will observe more and more AR sources as missions go on
- But how much depends a lot on how strong cycle 25 is...

#### Conclasion



Active regions produce ~50% of solar wind at solar maximum

- This is a 'first guess', and needs more modelling + observations to confirm...
- ... but hopefully a good motivator to study ARs as solar wind sources!



### Partitioning AR/CH





# Varying Rss

**UC** 

