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Statistical analysis of magnetic flux decay rate in solar active regions

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We used magnetic field data acquired by the Helioseismic and Magnetic Imager on board the Solar Dynamics Observatory to measure the magnetic flux decay rate in more than 800 active and ephemeral regions observed between 2010 and 2016. Our results suggest that for most active regions a power law between the peak magnetic flux and flux decay rate holds. At the same time part of unipolar active regions deviate from the common behaviour: these unipolar sunspots form a different flux decay rate versus peak flux distribution and exhibit sufficiently lower relative decay rate as compared to the rest of active regions. We suppose that there exists some mechanism that stabilizes unipolar active regions.

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