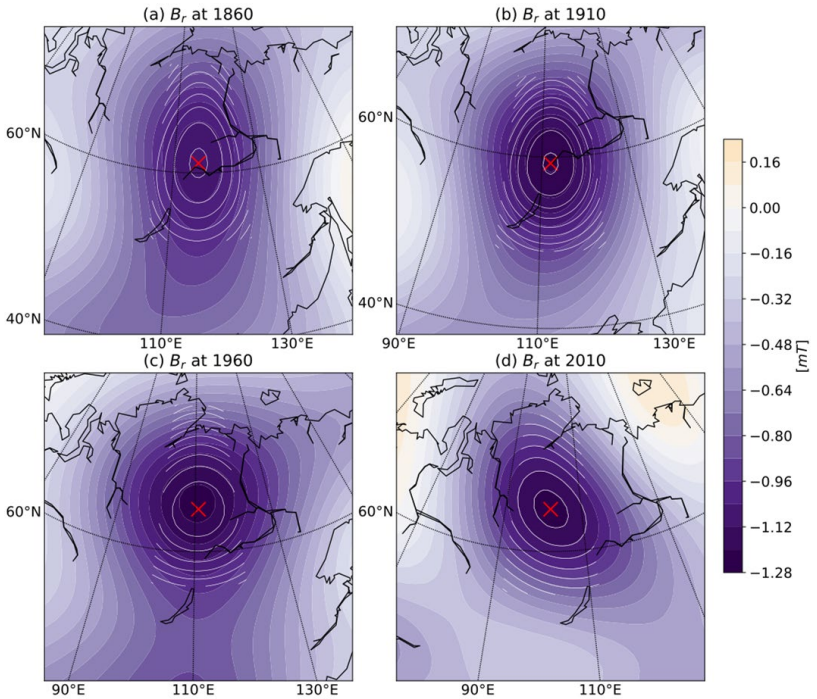
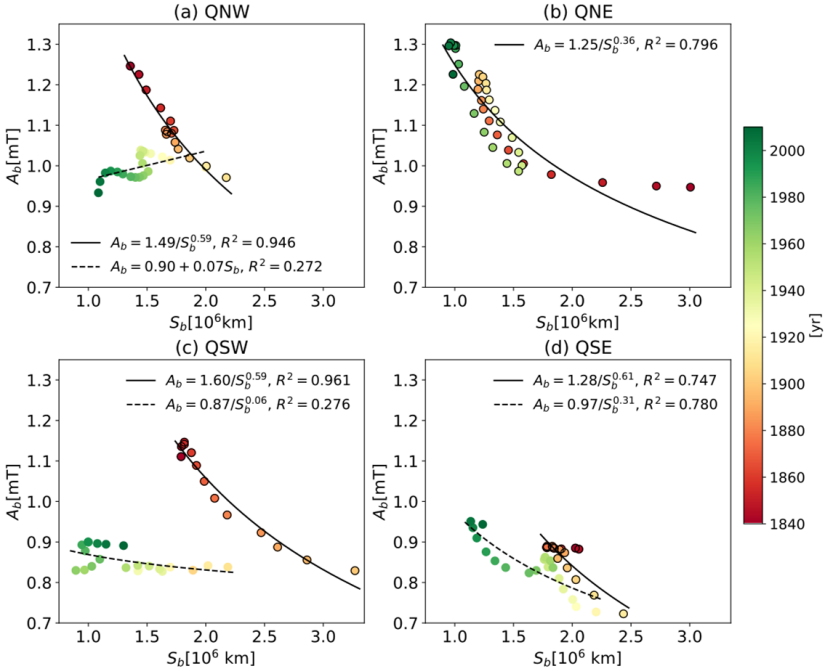
Regional outer core kinematics from the time dependence of intense geomagnetic flux patches

We fit the radial magnetic field in the vicinity of a flux patch by an anisotropic 2D-Gaussian.



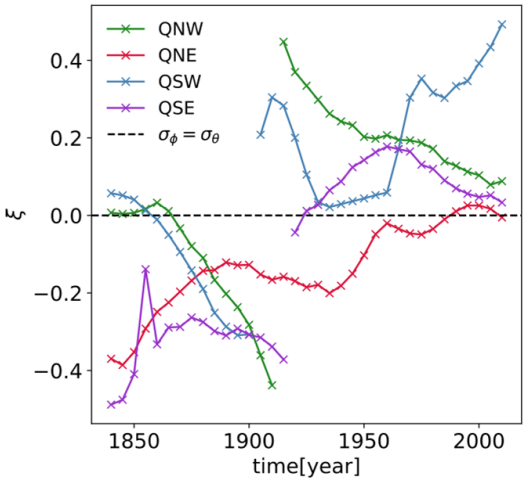
Intense high-latitude flux patch center identification (red Xs) and the fitted anisotropic Gaussians (white contours)

Allow estimation of off-grid patches centers location, amplitude (A_b), area (S_b) and anisotropy (ξ).



Hyperbolic fit between A_b and S_b provide evidence for regional stretching SV:

$$A_b = C/S_b^{\alpha}$$



The level of anisotropy of the patches is compute by the ratio:

$\xi = (\boldsymbol{\sigma_\phi}-\boldsymbol{\sigma_\theta})/(\boldsymbol{\sigma_\phi}+\boldsymbol{\sigma_\theta})$

Terra-Nova, F. and Wardinski, I., Physics of the Earth and Planetary Interiors 344 (2023) 107106