Data mining of spacecraft magnetometers has been recently used to derive highly accurate reconstructions of Earth's magnetic field. We utilize localized resistivity guided by these data-derived reconstructions to induce magnetic reconnection in Earth’s magnetotail in our simulations.

- Global simulations often produce x-lines (location of magnetic reconnection) much closer to Earth than observed.
- Localized resistivity in global magnetohydrodynamic simulations “encourages” magnetic reconnection in specific locations guided by data mining of magnetometer measurements.
- Active x-lines at $\lesssim 20$ Earth radii ($R_E$) in the magnetotail transport magnetic flux Earthward and thus suppress the formation of unrealistic x-lines magnetotail distances $\gtrsim 15R_E$ by preventing the current sheet from collapsing.