Variations of the Earth’s magnetic field on times scales ranging from one year to several thousands of years (the geomagnetic secular variation) are generated by dynamical processes within the Earth’s core, including convective motions, torsional oscillations, waves and diffusive processes. Various types of data are used to study these phenomena: high-precision satellite observations, which provide a description of the main field and its variation with an unprecedented spatial resolution over the 2000-2010 time interval; magnetic observatory recordings, which in some places have been continuous for more than 150 years; historical ground measurements, as well as archeomagnetic and paleomagnetic measurements, enabling to go back in time for several thousands of years. Empirical models constructed from these various datasets enable to recover the main field and secular variation at the core-mantle boundary, calculate core flows and test theoretical models of short timescale core dynamics. This presentation will review recent results on the topic of the geomagnetic secular variation, focusing on interpretations in terms of physical processes within the core. It will briefly cover the relevant material presented during the conference.