Geomagnetic field modeling has seen tremendous progress over the past decade, thanks to successful low-Earth orbiting satellite missions such as Oersted and CHAMP. Although some models are calculated from satellite data only, magnetic observatory data remain an essential ingredient of field modeling. They are used for calculating geomagnetic indices which enable precise data selection, help disambiguate space and time in external field models, and provide independent datasets for field model validations. This talk will focus on two applications of observatory data in field modeling: the validation of core field models using quasi-definitive data, i.e., baseline corrected data prepared a few days after their acquisition and very near to the definitive data; the validation of spherical harmonic models of the geomagnetic Sq field calculated from CHAMP data. It is expected that similar validation strategies will be used during the upcoming ESA Swarm mission, to be launched in 2012, as part of the preparation of level 2 data products.