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# Toward a new Swarm-based global electromagnetic picture: results from the simultaneous use of Ørsted and CHAMP data

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The electromagnetic properties of the largest part of the Earth's mantle (down to about 2000 km) can be better characterized thanks to the magnetic field measurements provided by the recently launched Swarm satellite mission. Here we present a study using both Ørsted and CHAMP measurements as a unique equivalent before the awaited Swarm ones. Instead of the usual single-satellite approach, which generally assumes a dipolar geometry for the external field, we solve the global electromagnetic induction problem by extending the single-satellite procedure to the multi-satellite case. In addition we use a new proxy for the temporal variability of the external source derived from $a\sigma$ indices and computed as a function of magnetic local times. The results obtained up to degree three and for three independent one-year-long time series, demonstrate that this new proxy leads to an improvement of both spatial (to high latitude, $|\theta| > 50°$), and temporal resolutions, especially at short periods (between 12h to 10 days). These new results are compared to previous studies to show the possibilities offered by this new approach.