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Research Interests:

Behavior of the ancient geomagnetic field. Statistical analysis of paleomagnetic data. Applications of paleomagnetic data to geological problems.

The research during 2016 of myself and my students and post-docs was primarily focused on the field of archaeomagnetism, a line of research that combines the disciplines of paleomagnetism and archaeology. Three current and former post-docs in the Scripps Paleomagnetic Laboratory produced new constraints on the geomagnetic field variations of the Levant (Shaar et al., 2016) and China (Cai et al., 2016) and applications of such regional field behavior to solving archaeological problems (Ben-Yosef et al., 2016).
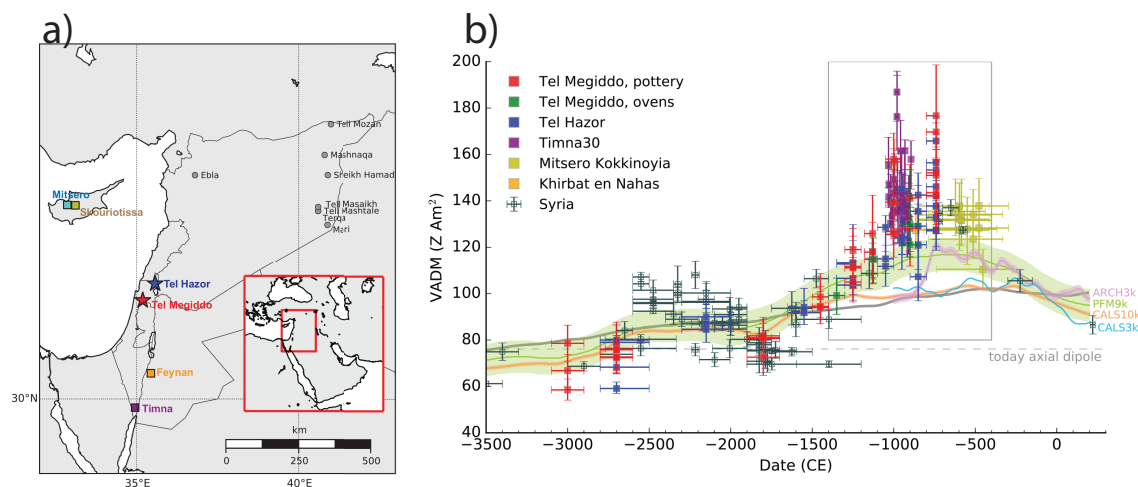

Figure 1: a) Locations of studies included in compilation of Shaar et al., 2016 for the Levantine Archaeomagnetic Curve. b) Colored filled symbols show sites with measurement data in the MagIC database (http://earthref.org/MagIC). b) Geomagnetic field intensity in the Levant from 3500 BCE to 400BCE [Figure from Shaar et al., 2016]. Open gray symbols are other published data from Syria. Solid curves show prediction of global geomagnetic models for Jerusalem. All references are in (Shaar et al., 2016). There is an excellent agreement between the different datasets. The data show a steady increase in field intensity from a minimum value at ca. 1800 BCE to a geomagnetic maximum (Iron Age Levantine Anomaly) between the 10th and the 8th centuries with two spikes events.

On another related front, we made some progress toward the goal of Open Science. Breakthroughs in paleomagnetic and rock magnetic research increasingly rely on the ability to draw on archives of previously collected data. The ability to merge published data with new

results, and to 'reuse' published data in applications to new problems is an exciting possibility. The Magnetics Information Consortium (MagIC) database (http://earthref.org/MagIC) provides an archive with a flexible data model for paleomagnetic and rock magnetic data. To facilitate this effort, we published the PmagPy software package (Tauxe et al., 2016). PmagPy is a cross-platform and open-source set of tools written in Python for the analysis of paleomagnetic data that serves as one interface to MagIC. We documented the PmagPy software package (archived at github) and illustrated the power of data discovery and reuse through a reanalysis of published paleointensity data.

Publications from 2015

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Cai, S., Tauxe, L., Deng, C., Qin, H., Pan, Y., Jin, G., Chen, X., Chen, W., Zhu, R., New archaeomagnetic direction results from China and its constraints on paleosecular variation of the geomagnetic field in Eastern Asia, Geophys. J. Int., 207, 1332-1342, doi:10.1093/gji/ggw351, 2016.