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High secular variation at low latitude. Paleomagnetic and archeomagnetic results from Ecuador

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Very few archeomagnetic results are available for the southern hemisphere and more data are needed to better constrain the global geomagnetic field models over the past few millenias. We will present new paleomagnetic results from volcanic rocks of the Tungurahua volcano and results from 5 units from the Rumipampa archeological site in Quito. Few lava flows are available for paleomagnetic sampling but numerous C14 ages in pyroclastic flows are available to describe the recent evolution of the Tungurahua volcano [Le Pennec et al., 2008]. In these well-dated pyroclastic flows, we sampled juvenile clasts of lavas. Results from the 2006 pyroclastic flow confirm the reliability of the paleomagnetic results obtained on the juvenile clasts. Results from the 1640, 1773, 1886 historical flows confirm the decrease in intensity from $40.1\pm4.0\mu$T for the 1773 flow, 35.0μT for the 1886 flow and $33.2\pm2.1\mu$T for the 2006 flow close to the expected field of 29.4μT from the 2006 IGRF data. The increase in positive inclination expected from the GUFM model is also observed in the data. Results from the pyroclastic flows in the time interval 500-1000BP indicate high paleointensities around 50μT. These high paleointensities are associated with negative inclinations and declinations at more than 30° from the present day field. These results are coherent with the archeomagnetic data obtained at Rumipampa. The secular variation observed near the equator indicates larger secular variation than the one observed in the CALSK model and suggests that the ARCH model may better reflect true secular variation. Data from sediments included in the CALSK likely smooth out geomagnetic field variations.