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Improved methods for geomagnetic data digitization and measuremen

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Large amounts of geomagnetic data have been collected since 1800′s by ground-based and spaceborne magnetometers. Part of the data still remain undigitized and most of the magnetic data produced by the orientation magnetometers on-board CubeSats are not meant for scientific purposes. We have built a digitization device named DigiMAG for historical data digitization and magnetometer concept CubeMAG for producing scientific grade magnetic measurements by CubeSats. DigiMAG can be used to semi-automatically run and scan the magnetic recordings from 35 mm films. These recordings can be furthermore handled by the Matlab routines that convert the data from the films to the digitized format. We selected to start the digitization from Scandinavian SMA-IMS magnetometer network data from mid 1900′s because that network gives the most dense magnetic field recordings available. The denser the network the better the local and global geomagnetic disturbances can be separated from each other. The CubeMAG magnetometer concept was developed for monitoring the magnetic field fluctuations. The first version of the CubeMAG will fly on-board ESTCube-2 satellite. The purpose of the experiment is to monitor the exospheric magnetic field fluctuations in the range of Pc5 pulsations, and better understand their solar and solar wind origins, occurrence rate and time evolution.