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# New idea of geomagnetic monitoring through ENA detection from the International Space Station: ENAMISS project

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Remote sensing of Energetic Neutral Atoms (ENA) in the Earth's environment has been proven to be a successful technique able to provide detailed information on the ring current plasma population at energies below 100 keV. Indeed, the existing space weather databases usually include a good coverage of Sun and solar wind monitoring. The global imaging of the Earth's magnetosphere/ ionosphere is usually obtained by the high-latitudes monitoring of aurorae, ground magnetic field variations and high-latitude radio emissions. The equatorial magnetic field variations on ground, from which the geomagnetic indices like Dst, Sym-H and Asym-H are derived, include the effects of all current systems (i.e. ring current, Chapman –Ferraro current, tails currents, etc...) providing a kind of global information. Nevertheless, the specific information related to the ring current cannot be easily derived from such indices. Only occasional local plasma data are available by orbiting spacecraft. ENA detection is the only way to globally view the ring current populations.
Up-to-now this technique has been used mainly from dedicated high altitude polar orbiting spacecraft, which do not allow a continuous and systematic monitoring, and a discrimination of the particle latitude distribution.
The Energetic Neutral Atoms Monitor on the International space Station (ENAMISS) project intends to develop an ENA imager and install it on the ISS for continuous monitoring of the spatially distributed ring current plasma population.
ISS is the ideal platform to perform continuous ENA monitoring since its particular low altitude and medium/low latitude orbit allows wide-field ENA images of various magnetospheric regions.
The calibrated ENA data, the deconvolved ion distributions and ad-hoc ENA-based new geomagnetic indices will be freely distributed to the space weather community. Furthermore, new services based on plasma circulation models, spacecraft surface charging models and radiation dose models, these latter having relevance in electric orbit raising, will be developed and made available for the satellite operators.
Finally, a continuous global monitoring of the geomagnetic disturbances in the inner magnetosphere via ENA imaging from the ISS could represent an innovative Space Weather data product for European infrastructures dedicated to geomagnetic data distribution and now-cast services as for example ESPAS and the Space Situational Awareness (SSA) program of ESA.