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Long-Term Modulation of Galactic Cosmic Rays

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Galactic cosmic rays (GCRs) are charged particles which are created within as well as outside our galaxy. Propagating through interstellar space they eventually are passing through the heliosphere where they become subjected to modulation processes such as diffusion, convection, drifts as well as adiabatic energy changes. Thereby, the modulation strongly depends on the level of solar activity. Hence, changes in solar activity are reflected in the GCR flux observed in the Earth's vicinity. Ground-based instruments such as ionization chambers and neutron monitors provide a continuous record of the cosmic ray intensity, and thus solar activity, back to 1936. Moreover, the GCR flux at Earth results in the atmospheric production of so-called cosmogenic radionuclides (e.g. ^{10}Be and ^{14}C). Being stored in natural archives like ice-sheets and tree rings, cosmogenic radionuclides can thus preserve information about solar activity variations over thousands of years. Here we will give an update of the solar modulation reconstruction over the past 2000 years with focus on the most recent knowledge about the local interstellar spectrum (LIS) and the related ^{10}Be and ^{14}C production rates depending on solar and geomagnetic shielding. Furthermore, the updated record will be compared to the revised sunspot record.