

Scientific research in support of space weather goals

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Unlike terrestrial weather, space weather is immature from a scientific point of view. While the last decades have seen tremendous scientific progress, which, among others, manifested itself in form of advanced space weather models, many key scientific processes underpinning space weather remain poorly understood or not understood at all. These processes span the gamut of Heliophysics domains; starting from magnetic field generation processes in the solar interior and reaching to Earth's upper atmosphere, where we still lack knowledge of the processes responsible for ionospheric scintillations. In addition, we are in many, rather fundamental from a space weather point of view, cases not able to predict with any confidence the expected amplitudes of space weather phenomena. This presentation will review scientific progress to-date, and attempt to map out a path forward toward the desired quantitative and accurate predictability.

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