Coupling the solar dynamo and the corona: wind properties, mass and momentum losses during an activity cycle

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We study the connections between the sun's convection zone and the solar wind and corona. Magnetic fields generated by a 2.5D axisymmetric kinematic dynamo code (STELEM) evolve in a 2.5D axisymmetric coronal MHD code (DIP). The computations cover an 11 yr cycle. The solar wind's velocity varies in latitude and in time in good agreement with the known time-latitude asymptotic wind speed diagram. Overall sun's mass loss rate, momentum flux and magnetic braking torque vary considerably throughout the cycle. This cyclic modulation is mostly determined by the latitudinal distribution of the sources of open magnetic flux (and solar wind) and closed flux, which in turn results from the interplay between the dynamo generated field and the solar wind flow.