

太陽内部と表面をつなぐ大規模シミュレーション

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Large-scale connecting the solar interior and the surface

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The solar convection zone is filled with turbulent thermal convection which is responsible for the energy transport and the generation of the differential rotation and the magnetic field. In terms of the space weather, the solar interior is the ultimate origin of the activities. It is important to understand the details of the solar convection. The solar convection is a multi-scale phenomenon. The convection temporal and spatial scales at the base of the convection zone are 200 Mm and a month, while those at the solar surface are 1 Mm and minutes, respectively. The large-scale magnetic field is thought to be generated around the base of the convection zone and the sunspots emerge at the solar surface. It is important to connect the deep convection zone and the solar surface to understand the origin of the space-weather activities. Thanks to recent development of the massive supercomputers, we succeed in carrying out a comprehensive calculation covering the whole convection zone for the first time. The calculation shows that the solar surface layer has unexpectedly weak influence to the deep convection. In the presentation, we show detail analysis and future applications of the calculation.