Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

PEM05-17 会場:303 時間:5 月 21 日 10:05-10:20

太陽表面下における浮上磁場の検出
Detection of the emerging magnetic flux beneath the visible surface of the Sun

鳥海 森 [1*], Stathis Ilonidis[2], 関井 隆 [3], 横山 央明 [1]
Shin Toriumi[1*], ILONIDIS, Stathis[2], SEKII, Takashi[3], Takaaki Yokoyama[1]

[1] 東京大学, [2]Stanford University, [3] 国立天文台
[1]University of Tokyo, [2]Stanford University, [3]National Astronomical Observatory of Japan

Solar active regions including sunspots are thought to be the consequence of the emerging magnetic flux from the deeper convection zone. They may cause catastrophic outbursts, i.e., flares and CMEs, into the interplanetary space. Therefore, it is important to study the signature of the emerging flux in the convection zone. However, looking inside the interior by direct optical observations is difficult. In this study, we report the detection of the emerging flux in the uppermost convection zone by helioseismic technique. We use SOHO/MDI Dopplergrams of NOAA AR 10488 to investigate the temporal evolutions of acoustic oscillation powers at six different layers (-15 to -2 Mm) beneath the visible surface of the Sun. As a result, we detect the power reductions up to 2 hours before the flux begins to emerge at the surface. The start times of the power reductions show a rising trend of the order of 1 km s^{-1}, with a gradual deceleration with time. If we assume that the power-reducing agent detected here is actually the magnetic flux, the rising speed of 1 km s^{-1} is well in accordance with previous observations and numerical simulations. The detection of the emerging magnetic flux under the solar surface may allow us to know the mechanism of the magnetic process in the Sun, and may improve space weather science.

キーワード: 太陽, 磁場, 太陽内部, 光球, 宇宙天気
Keywords: Sun, magnetic field, solar interior, photosphere, space weather