SUNRISE III/SCIP observations of three-dimensional magnetic fields in the solar atmosphere

M. Kubo[1], Y. Katsukawa[1], Y. Kawabata[1], T. Oba[2], T. Matsumoto[3], R. T. Ishikawa[4], Y. Naito[5], T. Shimizu[6], H. Hara[1], F. Uraguchi[1], T. Tsuzuki[1], K. Shinoda[1], T. Tamura[1], Y. Suematsu[1], J. C. del Toro Iniesta[7,8], D. Orozco Suarez[7,8], M. Balaguer Jimenez[7,8], C. Quintero Noda[9], S. K. Solanki[2], A. Korpi-Lagg[2], and SUNRISE-3 team

[1] National Astronomical Observatory of Japan, 2-21-1 Osawa, Mitaka, Tokyo 181-8588, Japan
[2] Max-Planck-Institut fur Sonnensystemforschung, Justus-von-Liebig-Weg 3, 37077 G ottingen, Germany
[3] Institute for Space-Earth Environmental Research, Nagoya University, Furocho, Chikusa-ku, Nagoya, Aichi 464-8601, Japan
[4] National Institute of Fusion Science, 322-6 Oroshi-cho, Toki, Gihu 509-5292, Japan
[5] The Graduate University for Advanced Studies, SOKENDAI, 2-21-1 Osawa, Mitaka, Tokyo 181-8588, Japan
[6] Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency, 3-1-1 Yoshinodai, Chuo-ku, Sagamihara, Kanagawa 252-5210, Japan
[7] Instituto de Astro sica de Andaluci a (IAA-CSIC), Glorieta de la Astronomia s/n, 18008 Granada, Spain
[8] Spanish Space Solar Physics Consortium, S3PC
[9] Instituto de Astro sica de Canarias, 38205 La Laguna, Tenerife, Spain

contact e-mail: masahito.kubo@nao.ac.jp

Precise polariz ation measurements of numerous spectral lines across a broad wavelength range are essential for exploring the three-dimensional structures of the magnetic field in the solar atmosphere. They provide fundamental insights into the heating mechanisms and dynamic phenomena in the solar atmosphere. The third ight of the SUNRISE balloon-borne stratospheric solar observatory successfully completed 6.5 days of observations in July 2024. One of the focal-plane instruments onboard SUNRISE is the Sunrise Chromospheric Infrared Spectro-Polarimeter (SCIP) that is a slit-scanning spectropolarimeter to measure the polariz ation state of multiple spectral lines in the 850 nm and 770 nm wavelength bands, including chromospheric and photospheric lines, with the spatial resolution of 0.2. SCIP has obtained unprecedented spectropolarimetric data for various solar targets, including the quiet Sun regions, emerging ux regions, dark filaments, ares, and o -limb regions. In these targets, we find the interesting Stokes profiles associated with fine-scale three-dimensional structures in the photosphere and chromosphere. In this presentation, we will summariz e the initial findings from SUNRISE III/SCIP.