Overview of the scientific discoveries of the CLASP missions

R. Ishikawa [1], R. Kano [1], A. Winebarger [2], D. McKenzie [3], J. Trujillo Bueno [4], Frédéric Auchère [5], N. Narukage [1], D. Song [6], T. J. Okamoto [1], L. Rachmeler [2], and Clasp team

[1] *ational strono ical s r ator o a an o o a an*
[2] *ars all ac li t nt r unts ill*
[3] *nstituto d stro sica d anarias a a una n ri ain*
[4] *nstitut d stro si u atial rsa d ranc*
[5] *or a strono and ac ci nc nstitut a on u lic o or a*
[6] *ational c anic and t os ric d inistration ational nt rs or n iron ntal n or ation ould r*

contact e-mail: ryoko.ishikawa@nao.ac.jp

The magnetic field in the solar atmosphere plays a crucial role in the transfer of energy from the photosphere to the corona. The layer, where the ratio of gas pressure to magnetic pressure equals unity, is located in the chromosphere, and in the upper chromosphere, the magnetic field dominates the structuring and dynamics of the plasma. Therefore, measuring the magnetic field in this region is critical for understanding solar activity in both the chromosphere and the corona. To achieve this, we must measure and model the polarization of ultraviolet ( ) spectral lines that originate in the upper chromosphere, as they encode valuable information about the magnetic fields. To this end, a series of sounding rocket experiments S were conducted in 1 (S), 1 (S), and 1 (S .1). The first ight succeeded in the spectropolarimetric observations of the hydrogen yman-a line (1 1. nm), achieving high polarization sensitivity and accuracy of .1 . For the first time, S detected linear polarization produced by the scattering of anisotropic radiation in lines and observed polarization signals indicative of the Hanle effect in the upper solar chromosphere. n the second and third ights, by refitting the S instrument, we carried out spectropolarimetric observations across the Mg h k lines, which are also strong spectral lines of great interest for probing the magnetic fields in the upper chromosphere. These missions yielded unprecedented measurements of polarization signals caused by the oint action of scattering processes and the Hanle, eeman and Magneto- ptical effects. Furthermore, through coordinated observations with the Solar ptical Telescope (S T) aboard the Hinode satellite, we produced magnetic field maps extending from the photosphere to the upper chromosphere in an active region. n this talk, we summarize the scientific findings from the series of S experiments.