HIGH-RESOLUTION SPECTROSCOPY OF A SURGE IN AN EMERGING FLUX REGION

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The regular pattern of quiet Sun magnetic fields is disturbed by newly emerging magnetic flux, and all atmospheric layers are affected by its appearance. Hence, simultaneous observations in various spectral lines are needed to understand the interaction of rising flux tubes with the surrounding plasma during and after emergence. We observed a newly emerged region on 11 September 2018 using Vacuum Tower Telescope (VTT) at the Observatorio del Teide, Tenerife, Spain. High-spectral resolution spectroscopic observations using the Echelle spectrograph in three spectral lines Hα (656.3 nm, chromosphere), Cr I (578.1 nm, photosphere), and Hβ (486.1 nm, chromosphere) were obtained in the early growth phase of active region NOAA 12722. High resolution context images were obtained with a high-cadence CMOS camera system simultaneously recording broad- and narrow-band Hα images. The Solar Dynamic Observatory (SDO) provides additional continuum images, LOS magnetograms, and EUV images, which link the different solar atmospheric layers. The region started as bipolar region but the continuous flux emergence in the region resulted in many mixed polarity features between leading and trailing pores. The region evolved fast and completely disappeared by 13 September 2018. In the beginning it contained an arch filament system. However, the leading part included an absorption feature that surged. Strong up and downflows occurred in close proximity to this feature. We will present various physical parameters such as line-of-sight (LOS) velocities and line core intensity obtained in three spectral lines characterizing both the surge and the overall active region.