

H α Observations of the Dual Eruptive Prominences of June 29, 1994

L. Lenža

Astronomical Observatory, Vsetínská 78, 757 01 Valašské Meziříčí, Czech Republic

Abstract. Our results in the field of observing prominences at our observatory show dual eruptive prominences on June 29, 1994 obtained by a coronagraph at our observatory at Valašské Meziříčí. We tracked the evolution of these eruptive prominences in time and morphology.

1. Data

The source of these observations was a prominence patrol running at Valašské Meziříčí Observatory. For taking pictures of active prominences (and also of the overview pictures) we use an H-alpha coronagraph with Zeiss E 150/1950 mm objective with Šolc filter (passband 0.5 nm) and KODAK 2415 Technical Pan film or KODAK SO115 film (developer D-19 at 21°C).

Chromospheric observations made by colleagues from the Solar Department of the Astronomical Institute AV ČR at Ondřejov (Czech Republic) were also used in this paper. They used a refractor 210/3410 with a Daystar (0.06 nm) H α filter and a CCD camera.

Other data were obtained from the Internet and Solar Geophysical Data.

2. Observations

On June 29, 1994 the prominence patrol started shortly after 07:00 UT. Along with a few small prominences, two larger ones were registered, the first of them at the position N11°E (Figure 1) and the second at S20°W (Figure 2).

During a few hours both prominences showed a lot of activity. and disarptions brusques occurred almost simultaneously. The global morphological evolution of both events can be seen in Figure 1 and Figure 2. In both events, at almost same time, a destabilisation occurred, the origin of which could be the emergence of new magnetic flux at the surface. The question is whether the coexistence of this couple of events is accidental or somehow has a global cause.

2.1. Eruptive Prominence – N11°E (Figure 1)

At 08:12:54 UT brightness variations were observed in this prominence at some points. Unfortunately, on the photographs that were taken nothing is visible, so we can not specify which area it was. Information about these brightness variations comes from the visual observation (notation in the observer's diary).

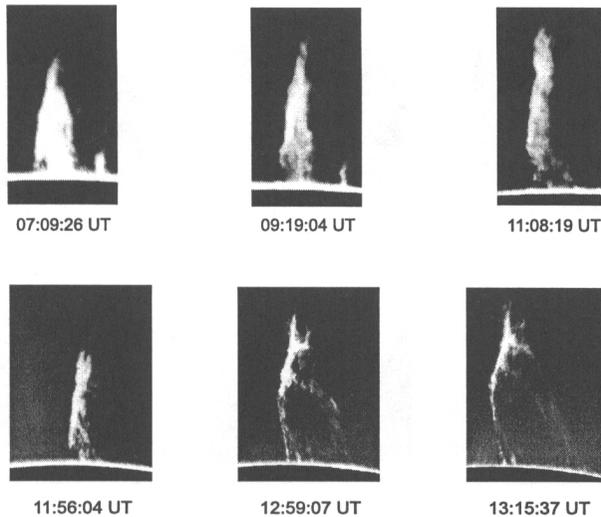


Figure 1. The evolution of prominence E N11. Date: June 29, 1994; Device: $H\alpha$ coronagraph with Zeiss E 150/1950 mm objective with Šolc filter (passband 0.5 mm); Position: E N11; Scale of the original image: 1 mm=6500 km; Material: KODAK SO115; Observer: Libor Lenža.

The evolution of the prominence on Figure 1 can be compared to the increasing height of the top of the prominence, measured relative to the solar limb (Figure 3). The increasing speed of the prominence as projected on the sky was rising from the values of kilometers per second to tens of kilometers per second. Further observations were interrupted by cloudiness.

2.2. Eruptive Prominence – S20°W (Figure 2)

After the beginning of the observation, a nervalike mass outflow, heading out from the prominence to the nearby surroundings was observed. On the mosaic of images in Figure 2 we can follow the evolution of the prominence. The morphology of the prominence can be compared with its altitude in the sky projection (Figure 3).

On the images taken after 10:00 UT we can find signs of fragmentation into smaller arched formations, which as a whole, keep the original shape of the prominence. It was probably caused by the emergence of new magnetic flux at the surface.

The material from the rising prominence runs down along magnetic force tubes connecting the top of the prominence with the chromosphere. In these structures we can also see hints of twisting (Figure 2 – 13:04:44 UT).

3. Discussion

We are not able to say anything objective about the interesting time coincidence, which means we can not say whether both these events have the same

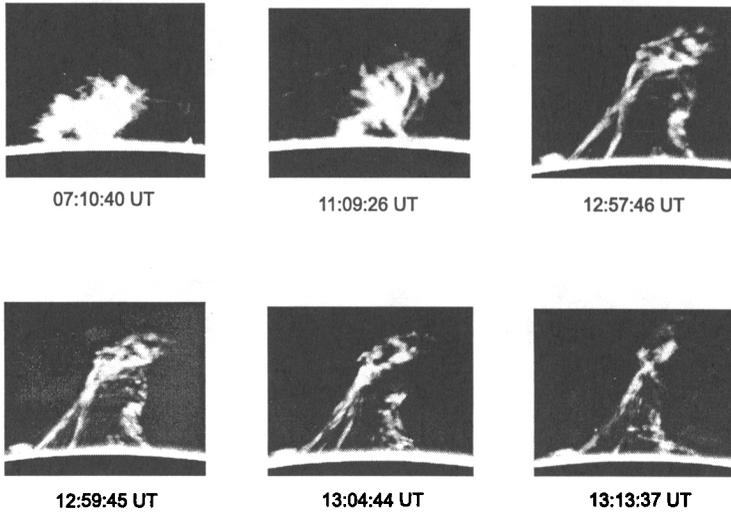


Figure 2. The evolution of prominence W S20. Date: June 29, 1994; Device: $H\alpha$ coronagraph with Zeiss E 150/1950 mm objective with Šolc filter (passband 0.5 mm); Position: W S20; Scale of the original image: 1 mm=6500 km; Material: KODAK SO115; Observer: Libor Lenža.

cause, or whether they are unrelated results of some global event. Both prominences were situated away from active regions (there were not many of them on the sun at that time). This leads us to suppose, that the impulse for the prominence activation was not flares, but rather new emergence of magnetic flux. However, the possible eruption activity behind the limb could also cause this effect. Surrounding the prominences on the western limb were old, decayed active regions (NOAA 7736, 7737, 7740). On the eastern limb was NOAA 7746, which appeared on the disc on July 2, 1994 (heliographic latitude $N10^\circ$).

At the available radio frequencies no significant effect was found which could have a definite connection with eruptive prominences.

4. Conclusion

Observation of the two prominences on June 29, 1994, whose phase of activation was during the same time interval, was from time to time interrupted by cloudiness. This is one of the reasons, why we can not say more about the whole morphological evolution of these events.

It is very useful to compile and analyse all the available data about such interesting double eruptive prominences (e.g., Koutchmy and Noëns 1994).

References

- Koutchmy S. and Noëns J. C. 1994, in *Solar Dynamic Phenomena and Solar Wind Consequences*, ESA SP-272, p. 91

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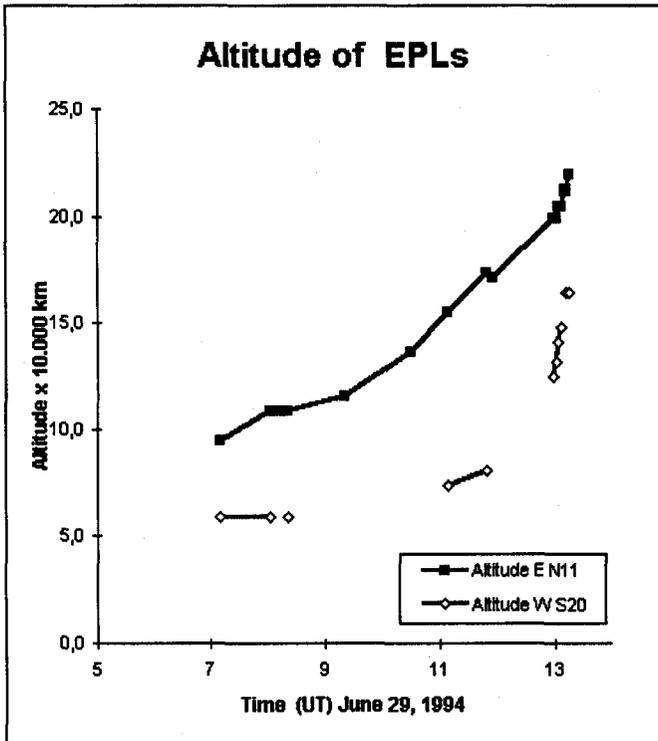


Figure 3. Time evolution of altitude of EPLs.