PROPER MOTIONS IN HALE REGIONS 18405 AND 18511 (2-14 JUNE, 4-16 AUGUST 1982)

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Abstract

Between June 2-14 and August 4-16 1982 there were two active regions on the north hemisphere of the Sun (Hale regions 18405 and 18511). We investigated the first and third rotation of these regions. We found an about eighteen-day-long torsional oscillation of sunspot umbrae exists.

Introduction

In this article we present the study of the sunspots proper motions in a large activity complex over four solar rotations. These four solar rotation were from June to September 1982 (Hale Region 18405, 16474, 18511 and NOAA 3885, 3886) and the active regions were between L:307-305, B:7-22. Two of these four active regions have already been written up [1,2]. In our work we try to write up the first and the third rotation of these regions.

Discussion

In our work we investigated the motions of the umbrae in the Carrington system and a few rotations of the umbrae.
The HR 18405 sunspot group was well developed when it appeared. Different polarities of the umbrae occurred in the P part of this group for example spot 3,4 and 6 are northern and the others were southern in Fig.2. The leading umbra of the June group consisted of 2 main parts (3 , 4). In the beginning these 2 umbrae moved toward each other. After clashing one of them turned back.
In the third rotation the leading spot became compact and this sunspot group stretched 26 degrees in the Carrington system. The P part motions of the third rotation of the sunspot group is shown in Fig.3. We fitted an ellipse around the umbra spot A. We studied the angular of the major axis of this ellipse in the Carrington system. The result is shown in Fig.5. The P part of third rotation divided into two main parts in the fourth rotation. This region has been published [1].

We found the following result:

- the direction of this rotation changed. We think the P part performed a torsional oscillation which had about an 18 day-long period.

Reference

1./ G.Csepura and I.Nagy: 1987, *Publ. Astr. Inst. Czechoslovak Acad. Sci.* No. 66, p. 157-160
2./ B.Kálmán and I.Nagy: 1988, in V.N. Obridko, G.Ya. Smolkov (eds.), *Solar Maximum Analysis*, Novosibirsk, p. 47-50

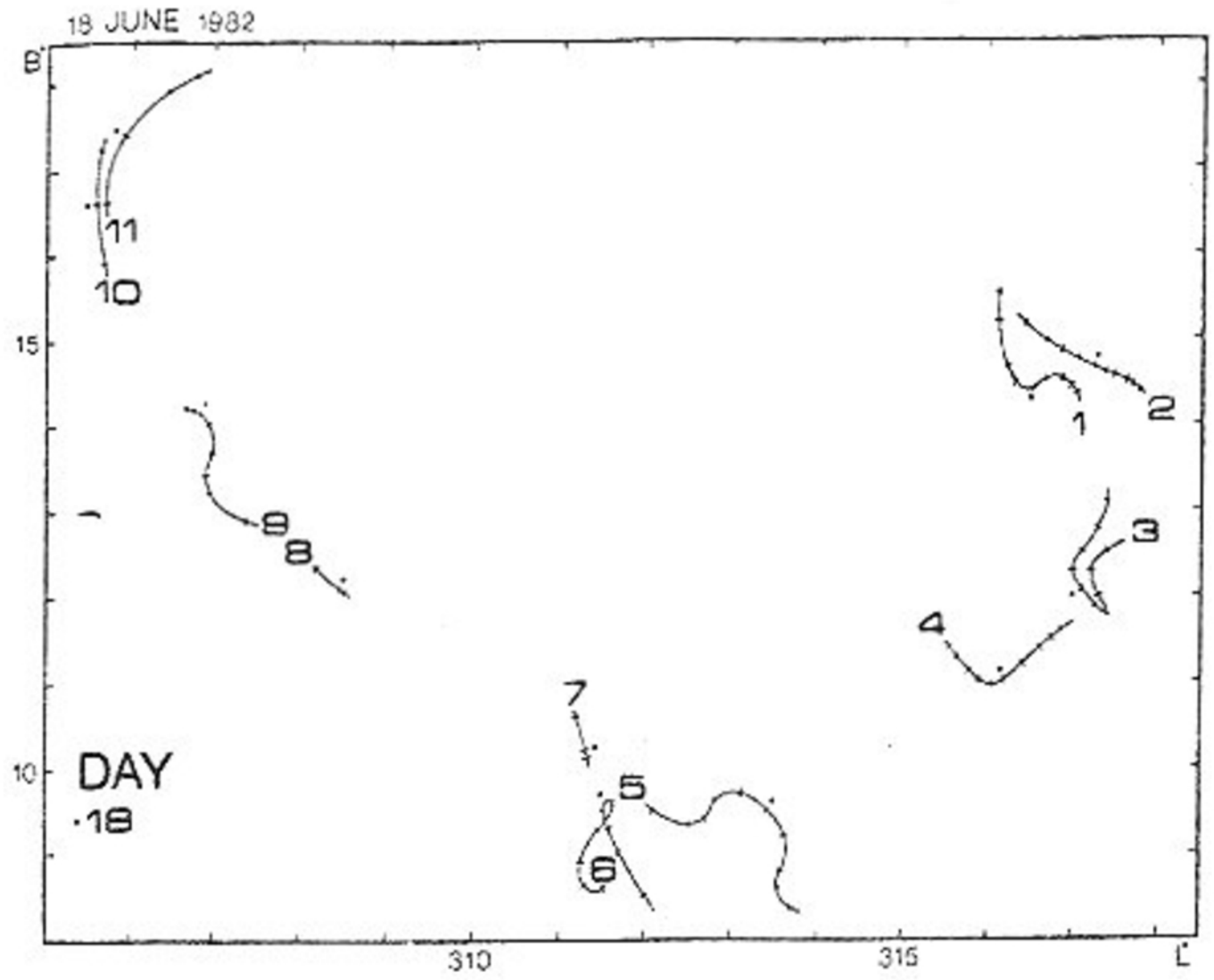

Figure 2.

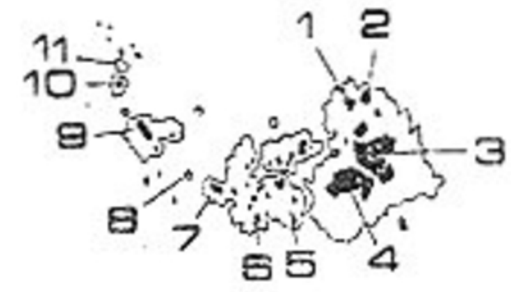

Figure 1.

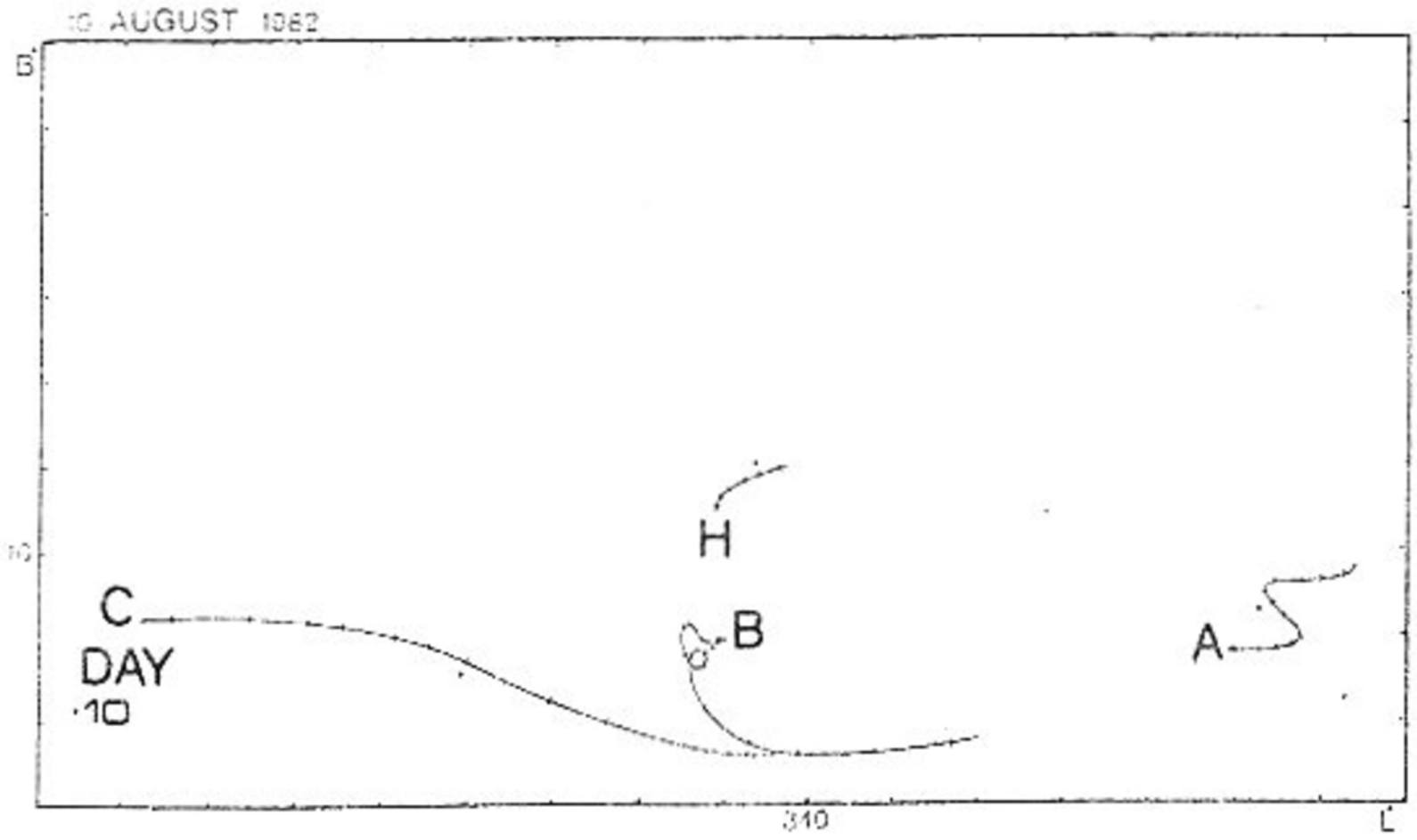

Figure 3.

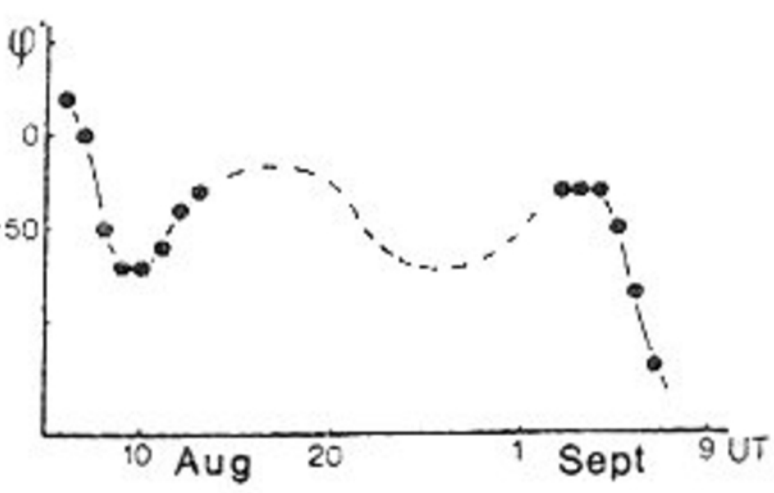

Figure 5.

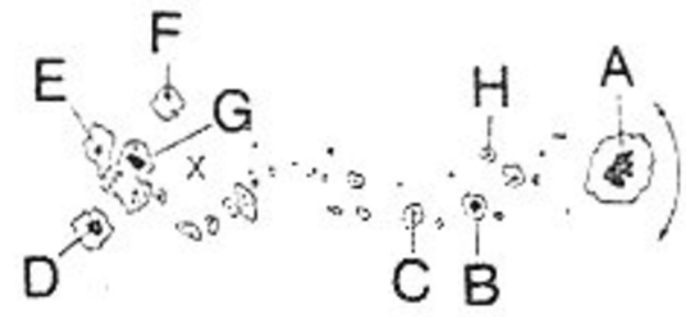

Figure 4.