

Coordinated Observations for High School Students as Hinode EPO Activity

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Introduction

As one of education and public outreach(EPO) activities of Hinode, we have performed coordinated observations with high school students, public observatories and science museums, every year since 2010.

This has been carried out as HOP173 "EPO campaign observation mainly for high school students". The goals are that they have interests in Hinode data and compare their own data with Hinode data. They study Hinode data as references of their data and obtain new solar knowledge, which make their motivation higher on their activities. The students have a presentation on the observation results at science contests. In addition, students practiced teaching materials developed with use of the coordinated data.

Table1) Observation Terms

2010	9/1-6	12/14-20
2011	7/24-8/6	12/19-24
2012	7/23-31, 8/26-9/1	12/17-22
2013	7/22-27, 8/26-31	12/16-21(TBD)

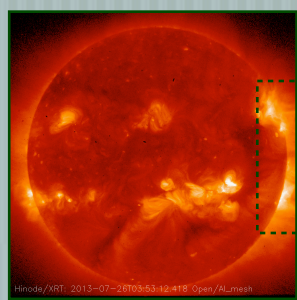


Fig.1) XRT image on 26-Jul-13

Table2) Participating Schools & Astronomical Facilities

No.	Pref.	School/Facilities	Observation Method	2010	2011	2012	2013
1	Saitama	Saitama Univ. ※	VL · Ha · CaK		○	○	○
2	Saitama	Urawa-Nishi HS	VL · Ha	○		○	○
3	Saitama	Kawauchi Sogo HS	Ha · Radio				○
4	Tokyo	Tokyo Science Univ.	Ha				○
5	Kanagawa	Keio High School	Ha		○		○
6	Shiga	Maibara High School	VL · Ha · CaK	○	○	○	
7	Osaka	Kishiwada High school	Drawing	○	○	○	○
8	Hyogo	Hyogo Univ.High School	VL		○		○
9	Hyogo	Mita Seishokan HS					○
10	Hiroshima	Shudo High School	VL · Drawing · Ha		○		○
11	Hiroshima	Hiroshima Johoku HS	VL		○		○
12	Miyazaki	Kobayashi-nishi HS	VL		○		○
13	Saitama	Kawaguchi Science Museum	VL · Ha · CaK · MF	○	○	○	○
14	Shizuoka	Gekko Obs.	VL		○		○
15	Gifu	Heartpia Anpachi Obs.	VL · Ha		○		○
16	Hyogo	Nishiharima Obs.	VL · Ha · CaK	○	○		○

Results and Topics in 2013

This summer in 2013, we have a coordinated observation for two weeks(table 1). Two high schools participated in the observation for the first time(table 2). We unusually got good prominence data(Fig. 3). Some high schools had a presentation with the observation results at the science contests (Fig. 6, 7). Especially, one student of Hyogo Univ. High School has intense interests in this observation and asked me about Hinode data many times(Fig. 8). This observation was introduced at an open campus of a high school at Miyazaki pref.

For having attentions to the public, this observation was informed through social medeia such as twitter and face book. So that, amateur astronomers and the public have interests in the observation. Next winter, a coordinated observation will be performed between 16-21 Dec.

"Today, You are Solar Physicists"

On 27 Jan 2013, high school students practiced data analysis with Hinode data, taken with coordinated observations in Dec 2012. They took lectures, analysed Hinode data(Fig. 10) and finally had a presentation(Fig. 11). The practice theme are proposed as "Solar rotation", "Sunspot Change", "Solar flare" and so on, they selected one theme. In spite of short time, the students had this practice eagerly. They say, "It is very interesting to look into the sun under various consideration". The students understood the change of sunspots and solar flare from other students' presentations.

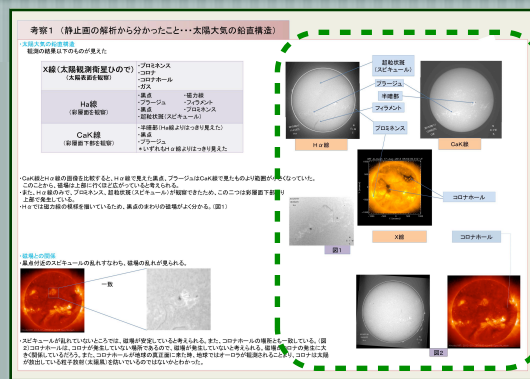


Fig.6) Presentation of Urawa Nishi HS. This reports the structures of the solar atmosphere

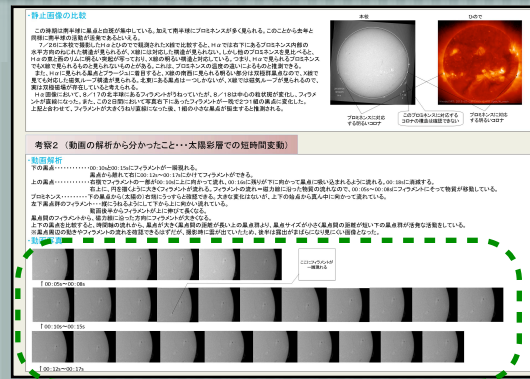


Fig.7) Presentation of Urawa Nishi HS. This reports short-time changes of chromosphere.

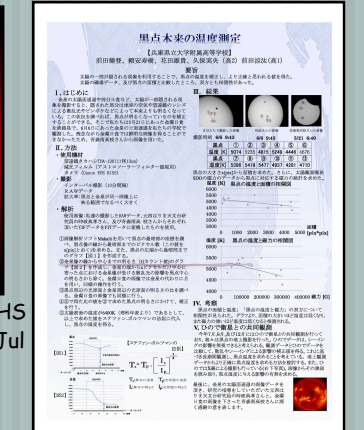
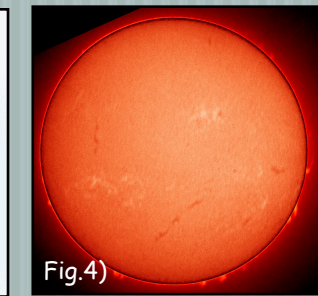
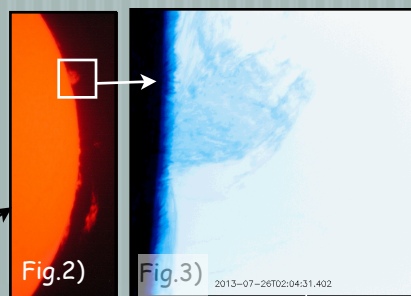


Fig.2) Ha by Hiroshima Johoku HS
Fig.3) Hinode/SOT/CaH on 26-Jul
Fig.4) Ha by Keio HS on 22-Jul

Fig.8) Presentation Poster of Hyogo Univ. HS. This reports measuring the temperature of sunspots.

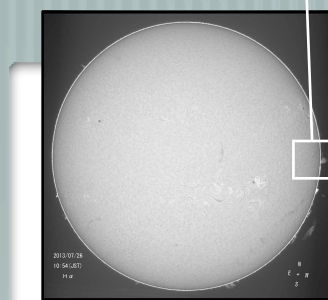


Fig.5) Ha image on 26-Jul by Urawa Nishi HS

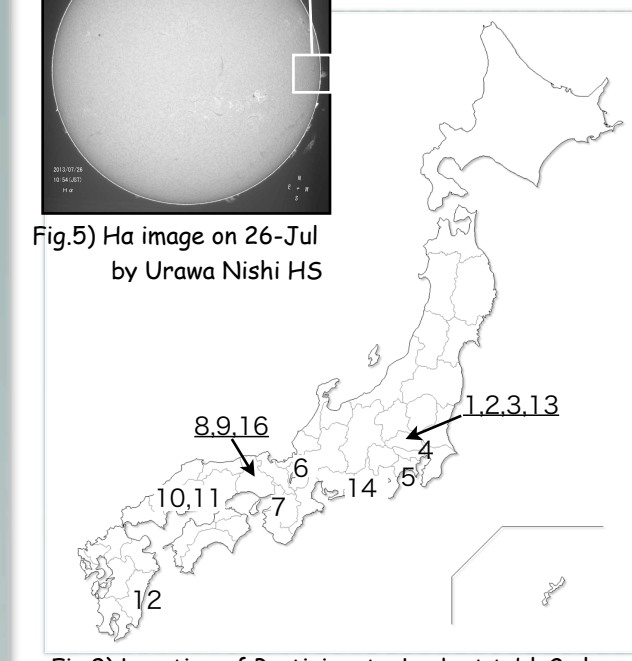


Fig.9) Location of Participants, Look at table2,also.



Fig.10) Practice and Analysis with Hinode data

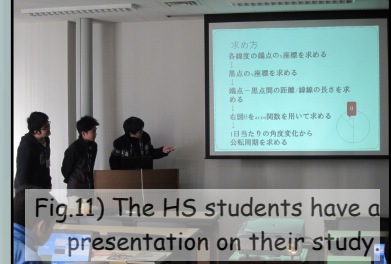


Fig.11) The HS students have a presentation on their study.

Summary and for Solar-C

We have performed coordinated observations with high schools and astronomical facilities every year since 2010, This year in 2013, more two high schools participated in the observation and some have a presentation with the observational results at the science contests. The participating students have intense interest and high motivation on the coordinated observations with Hinode. Accordingly, it is believed that the coordinated observations have played a important role in Hinode EPO. We would like to continue the coordinated observation next year.

Finally, I would like to comment EPO toward Solar-C. From our own EPO experiences, we must involve educators that belong to science museum, planetarium, public observatory and schools. It is important to interact with high school students, such as HOP173. It will need a key person and framework to promote/coordinate EPO. We would communicate the importance of science and the cutting-edged observation results along the current of the times to the public.

Acknowledgement

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Please Messages for Students !