

# Total solar eclipse education for young generation at Palangkaraya, Central Kalimantan

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**Abstract.** The path of Total Solar Eclipse (TSE) on March 9<sup>th</sup> 2016 passed through several cities in Indonesia and one of them is Palangkaraya, Central Kalimantan. The TSE natural phenomenon provided a special moment and gave unforgettable and lifelong experiences for children who live in Palangkaraya. Some miss-information and a bad impression can be felt by children who do not understand about TSE that causes momentary darkness during totality phase. Therefore we designed a children education programs about the TSE that as follow: (1) socialization about TSE, (2) Popular astronomy seminar, (3) How to observe the Sun? (4) writing competition about TSE and (5) TSE observation. The events were held on March 8<sup>th</sup> – 9<sup>th</sup> 2016. More than 200 representatives of elementary school students and teachers throughout Palangkaraya have actively participated. The keynote speaker was an Indonesian expert astronomer with help from alumni of astronomy olympiad in order to provide inspiration for the participants, especially to the students. We conclude that students as young generation of the nation may have more motivation to work in science by direct learning from natural phenomena.

## 1. Introduction

Interest in learning astronomy in Indonesia is not very high. Many people in Indonesia still have wrong perception about astronomy. This could be seen when astronomy events happen in Indonesia. Some people do not care what was happening. Many news that contain wrong information about the events are spreading very fast in Indonesian society. Therefore, Indonesian astronomers need to introduce astronomy further to the society. Astronomy events in Indonesia open good chance to introduce astronomy and correct many wrong news about the event. The special one is Total Solar Eclipse (TSE) happened on March 9<sup>th</sup> 2016. Many people do not know what is SE and how to observed it safely.

The path of Total Solar Eclipse (TSE) on March 9<sup>th</sup> 2016 passed through 12 provinces in Indonesia. One of them is Central Kalimantan, with its capital city Palangkaraya. The number of children in Palangkaraya (with age <15) is greater than a half of its population [1]. Elementary education in Palangkaraya quite good, as indicated by Angka Partisipasi Kasar (Gross Participation Ratio) at 110.95% and Angka Partisipasi Murni (Net Participation Ratio) at 96.47% [1], as well as the number



of Public Elementary School many (127 schools) and Private Elementary School (32 schools) in 2015 [2]. Thus, because of the rarity of the TSE event and the last TSE happened in Indonesia over 10 years ago; we believe that most of elementary school students have not ever seen the TSE. Beside that, astronomy can be used to attract young people to sciences and technology [3]. And we know that amateur astronomers (and professional astronomers, of course) can also make important contributions to education [4]. Therefore, we (the public outreach committee that include: professional astronomers, amateur astronomers, and local education stakeholder of Palangkaraya) intend to hold educational event and public outreach of TSE March 2016 in Palangkaraya with the main target for elementary school children.

## 2. Method and outreach activities

We held some activities to approach the goal to encourage Palangkaraya people, specially young generation to love science by experiencing the TSE phenomena. Constructive learning that is learning new ideas by direct experiences [5] was applied for the participants in this TSE event. We used educating, writing and observing as the methods. We educated participants by socialization about TSE and popular astronomy seminar. We held writing competition for elementary school students to evaluate the education achievement of TSE and astronomy seminar. And also gave chances the participants to experience the TSE and solar observation using telescope. Participants of the activities are elementary school students, their teachers, representative of education government and parents. The main location of activities were in SDN 4 Menteng and SDN Percobaan Palangkaraya.

### 2.1 Socialization about TSE

Socialization was held at SDN Menteng 4 started at 8.00 am. The activity held on March 8<sup>th</sup>, that was preparation to TSE observation in the next day. We presented information about TSE before the event using some movies about the TSE. We gave many information about TSE that had occurred on March 9<sup>th</sup> for about 2 minutes 30 seconds (Figure 1). The information are about phases of solar eclipse: contact time in Palangkaraya, location to observe the eclipse, and how to observe the eclipse.

### 2.2. Popular astronomy seminar

This activity was held at SDN Menteng 4, in parallel classes. Guest speaker at this seminar was Prof. Bambang Hidayat (Indonesian expert astronomer). At the seminar, Prof. Bambang reviewed a movie about basic astronomy. Some children asked Prof. Bambang about the movie and they discussed many aspects of astronomy and also about the TSE (Figure 2).

### 2.3. Solar observation

This activity was held at SDN Percobaan which is near to the SDN 4 Menteng. By using the portable telescope and special eclipse-glasses, students of SDN Percobaan observed the Sun. The students were very enthusiastic when observing the Sun, they got into long queue repeatedly to see the Sun with telescope or eclipse glasses.



**Figure 1.** Participants payed attention to the speaker of TSE socialization.



**Figure 2.** One of the student asked Prof. Bambang Hidayat about astronomy.



**Figure 3.** The student when participated writing competition. They looked happy but serious when made poem or short story about TSE.



**Figure 4.** Prof. Bambang and committee gave prize to three students who are the winner of short story competition about TSE.

#### 2.4. TSE writing competition

We invited elementary school students grades 1-4 to make a short story about TSE and grades 5-6 to create a poem about TSE. Participants who followed the event are 135 representative students from elementary schools around Palangkaraya (figure 3). We announced three winners for each writing poetry and short story competition (figure 4). We chose the winners based on three main criteria, i.e. conformity of science facts, plotting and aesthetic of the words they used.

#### 2.5. TSE observation

The activity was held at SDN Percobaan on 9<sup>th</sup> of March 2016. Around 6 am, observation was started. Even though, because of cloudy day and a light rain, we just observed with a pair of eclipse-glasses. When TSE in phase 1, we could not see the sun clearly because of black thin cloud. Phase 1 occurred from 6:23 am, after that an eclipse of the Sun by the Moon happened (figure 5). We could observe the Sun with eclipse-glasses from 6:13 am until 6:30 am. Before the totality, we had an opportunity to see a little light of Sun until the totality happened. The part of the Sun covered by black cloud during the totality was hard to see, therefore we could not see TSE process completely. When the landscape fell into darkness, the temperature dropped suddenly and nature became silent, insects and birds falling silent and all people shouting a big WOW! The cricket sang and children shouted repeatedly being astonished to feel the darkness in the morning like in the night. The totality happened at 7:28 am around 2 minutes 30 seconds. After the totality, the Sun just covered by much thin cloud, so that we could observe without eclipse-glasses. We could see the eclipse with cloud as the filter. Moreover, the children were enthusiastic to see eclipse in the last phase.

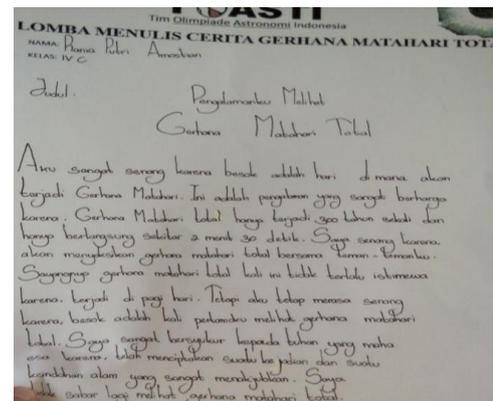


**Figure 5.** There was so much cloud around Sun direction during TSE process.



**Figure 6.** Participants observed TSE using special sun glasses. The glasses made from ND5 filter.

**Figure 7.** One sample of TSE short story made by Rania Putri. In the story she said: “My experience observe TSE, I am very happy that tomorrow is the day to observe TSE. This is valuable experience because the TSE only happen about 300 years once in same place and take time only about 2<sup>m</sup> 30<sup>s</sup>. I am happy that I will observe TSE with my friends. Although this TSE will happen in the morning, I am still happy because this is my first experience. I thank God because He creates miracle and wonderful phenomena. I cannot wait any longer to see TSE”.



### 3. Program reception

The TSE socialization was attended by more than 200 participants i.e. elementary school students representative from around Palangkaraya, their teacher and their parents. The participant enthusiasm can be seen from their passionate activity during this section. Moreover, the participant have high curiosity about the TSE which can be seen from so many questions they asked the speakers.

One of education achievement of TSE can be seen from the students work. About 79.1% students who participated in writing competition using TSE facts for their poem or short story (figure 7) i.e. the period of TSE, the danger of observing TSE in wrong way, and the duration of TSE. This high presentage show us there is small enough of misconceptions or inconsistent comprehension [6] about TSE that they got from our education programs. Furthermore, on March 9<sup>th</sup>, the participant followed the rules for the TSE observation. Moreover, participants were so interested that no one was frightened during the solar eclipse. They were very excited, counting down together and gave big applause followed by ‘wow’ expression at the time of totality TSE. Other important result that is we got 6 students as the champions of the writing competition of TSE. They could inspire and encourage others to be champions also.

### 4. Discussion

Education and motivation event by direct experiences will give unforgettable memories especially for very young generation. Children can have wonderful imagination after they experienced the unique phenomena, i.e. TSE. And also, it was a good chance to push them to create a big dream, especially in science, by getting inspiration from great role model from astronomy.

### Acknowledgement

The activities were helped by many people and elements. We thank to Intan Ophelia Binti as coordinator of the activities and TOASTI (community of astronomy olympian alumni), Prof. Bambang Hidayat, Education Service of Central Kalimantan, Liberti Hia from Kelas Inspirasi of Central Kalimantan, Tabengan Daily Newspaper, SDN 4 Menteng and SDN Percobaan.

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