GLOBE and Kirdkao Observatory's Projects

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Abstract

Kirdkao Observatory have carried out GLOBE training for schools in Thailand since 2000. The observatory currently running two projects, Learning modules on Earth Science and Astronomy (LESA) which help to provide learning materials supporting the GLOBE program, and LESA WS which trains students how to do research scientifically, provide data achive from HOBO weather stations and nurse GLOBE schools. The project has set up 5 automated HOBO weather stations at 5 parts of Thailand and collect data every 15 minutes. The data from LESA WS will also be useful for Basic GAPS.

Background

Kirdkao Observatory locates in Kanchanaburi province, 200 kilometers west of Bangkok. The observatory was founded in 1997 to serve Earth Science and Astronomy educational activities. We learned about GLOBE and applied GLOBE protocols to our activities since 1998. In September 1999, Thailand became GLOBE member, and a year later Thai staffs were sent to Nepal for training. We have been supervising the local school, Banyangsung, which was awarded with "GLOBE Star" within 2 months after the training.

In 2001, Elissa Levine and Jessica Robin, NASA soil scientists visited Kirdkao Observatory, Banyangsung school and Dara Academy school in Chaingmai province (northern part of Thailand). They introduced the use of HOBO data logger (Automated Soil and Air Temperature Monitoring Protocol) to collect data from those three sites at different depths (5, 10 and 50 cm depths) and air temperatures every 15 minutes. Student's data was used in General purpose simulation model of the Atmosphere Plant Soil System (GAPS), Cornell University.

In the second visit of Jessica Robin, she introduced the study on the effect of soil physical properties on the soil water drainage. The students study the comparison of soil physical properties of the three sites; Kirdkao Observatory, Banyangsung school and Dara Academy school. The students attended the GLOBE Learning Expedition Conference, Sibenik, Croatia in 2003 with the support of the Instutute for the Promotion of Teaching Science and Technology (IPST).

The GLOBE training facilities. (www.kirdkao.org)

Kirdkao Observatory covers the area of 1.35 square kilometers (see fig. 1). The entired area hosts facilities dedicated for GLOBE training activities which includes;

- an observatory equiped with solar telescope for observing the Sun
- classroom for lectures and workshops
- housing facilities for 60 persons
- three atmospheric study sites, including an automated weather station, a data loggers, and a normal air shelters.
- three hydrology study sites
- three soil study sites
- seven land cover study sites

All sites (not including land cover study sites) collect data continuously and represent Banyansung school.

Fig. 1 Map of Kirdkao Observatory's study sites

The LESA Project: Learning modules on Earth Science and Astronomy (www.lesaproject.com)

Though Thailand has joined GLOBE for 5 years and more than 200 schools have been trained, only 78 schools have registered with GLOBE. Among these schools, only 13 schools collected data and decreased to 8 schools this year. One reason of this problem maybe due to the lack of basic knowledge in Earth Science and lack of clear purpose of GLOBE experiment.

In 2002, Kirdkao Observatory was awarded a research grant from the Thailand Research Fund (TRF) for the "Learning modules on Earth Science and Astronomy" (LESA) project. The purpose of this project is to design and develop learning modules for Earth Science and Astronomy. The learning modules compose of Universe, Solar system, Energy Planetary Budget, Atmosphere, Hydrosphere, Lithosphere, Biosphere and Global Change. About 200 schools from all over Thailand were invited to join this project. The acvities in this project include designing education materials, testing the prototypes with teachers and students in science camps. This learning modules can provide the basic knowledge for the GLOBE program and GLOBE tools which can be downloaded from the websites, for example, cloud chart, cloud gallery (see fig. 2) and instuction for constructing sling phychrometer.

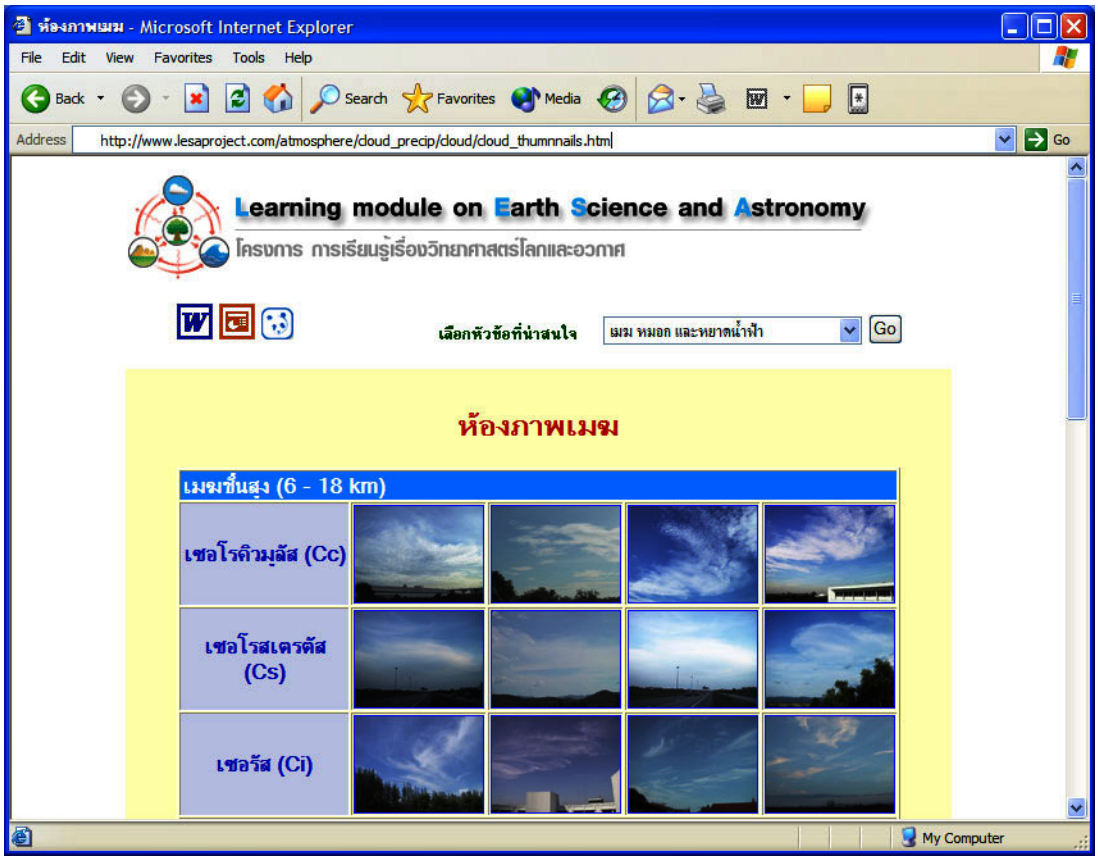

Fig. 2 An example page of LESA, Cloud Gallery.

LESA WS: Learning to be a Scientist with Automated Weather Stations (www.lesadata.com)

Since 2003, LESA project have been recognized among the schools in Thailand. The observatory was awarded a research grant for the new project, so called "Learning to be a Scientist with Automated Weather Station" (LESA WS). This project aims to train students to learn how to do science scientifically. The students will learn about GLOBE atmospheric protocols and how to analyse data from automated weather stations.

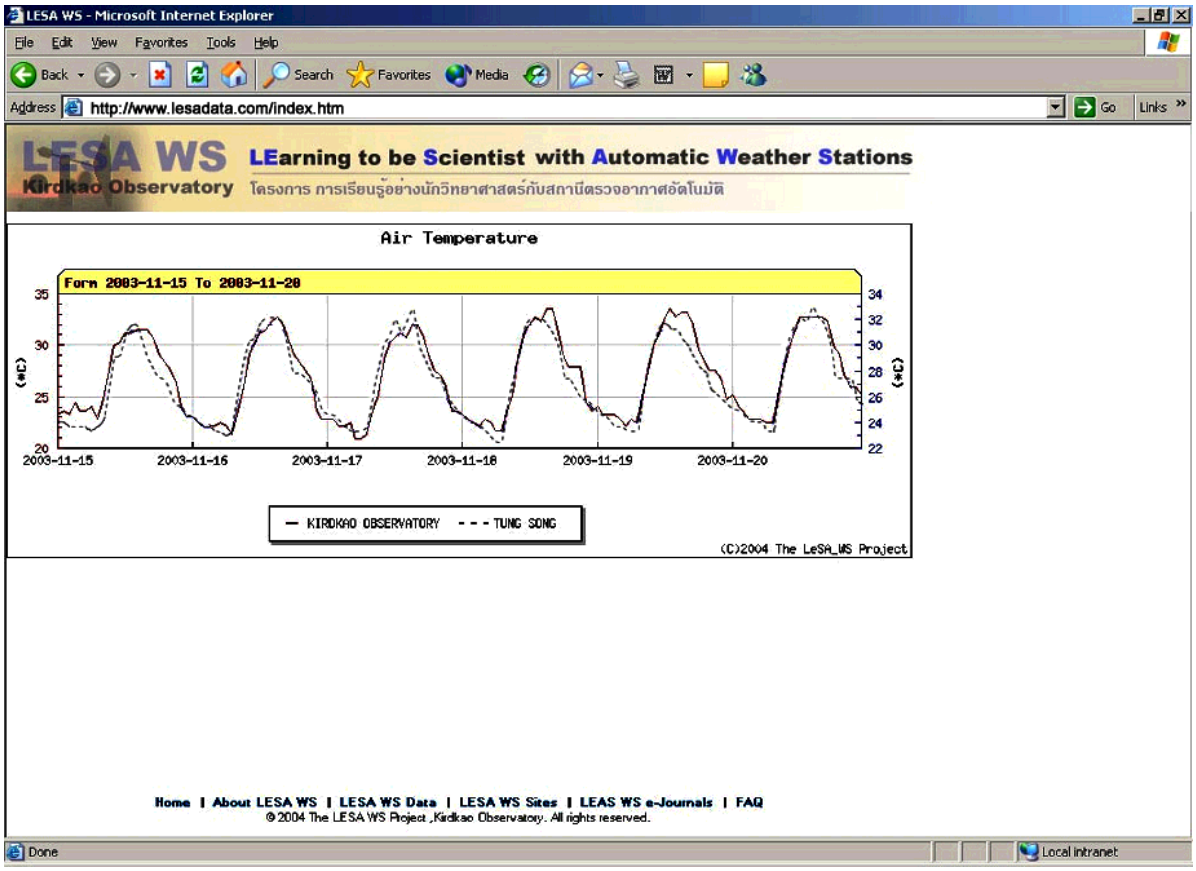

Fig. 3 An example page, LESA WS, air temperature data from Kirdkao Observatory and Tung Song.

The project has set up 5 HOBO-automated weather stations at 5 parts of Thailand; Chiangmai, Kanchanaburi, Nakorn Ratchasima, Tungsong and Bangkok (see fig.4). The weather stations collect data every 15 minutes. The website www.lesadata.com is designed to be the weather data archive for analysis and investigations. Three science camps are designed to train students on how to do research as the scientist. This projects also aims to nurse GLOBE schools in Thailand. Currently, 35 schools have been introduced to the GLOBE program. This data achive will provide the input data for Basic GAPS, a tool for investigating the dynamic and complex systems of the global environment.

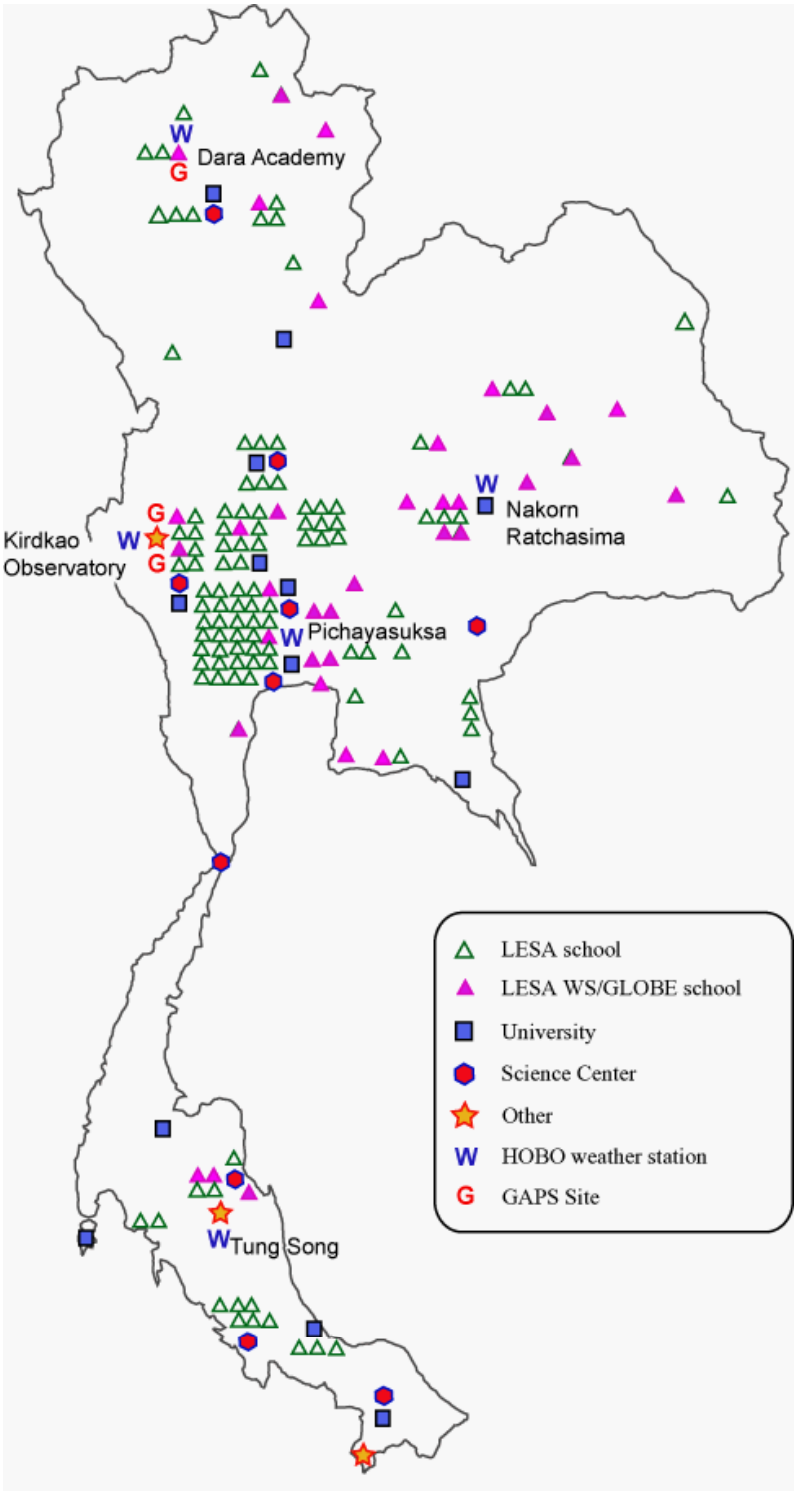

Fig. 4 Map of member schools in Thailand.

Acknowledgement

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