

Comité de Liaison Enseignants Astronomes Bridging the gap between French astronomers and teachers

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Abstract. The french committee linking astronomers and teachers (CLEA, <http://clea-astro.eu>) has been active for more than 30 years in the formation of teachers (from primary to high school) in the field of astronomy.

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1. What is CLEA?

Following the recommendations of IAU Commission 46 (teaching of astronomy) during the IAU General Assembly in 1976 held in Grenoble, France, the French “*Committee linking Teachers and Astronomers*” (CLEA) was founded to promote teaching of astronomy at every level of the education system, from nursery school to university, and to participate to the formation of teachers. This non-lucrative association is supported by the French Academy of Sciences and the French Astronomical Society.

In order to reach these objectives, many actions are engaged. First, a trimestrial journal, *Les Cahiers Clairaut* is published at every solstice and equinox. It includes in-depth articles, which present a physical or astronomical concept such as distance measurements, celestial mechanics, nuclear astrophysics, etc.; description of practical activities to be carried on with pupils (measuring the distance to the Moon, building a sundial, stellar spectroscopy, etc.); exchange of individual experiences; astronomical news and bibliography. Since 2009, a theme is developed each trimester. The first ones are: the constellations, the Earth, the planets, observation and instruments. The archives are now available in a DVD.

Second, a web site, <http://www.clea-astro.eu>, is maintained, which presents the life of the association. A free on-line encyclopaedia has been developed in the framework of the *Hands-On Universe (L’Univers à portée de main)* action.

Thirdly, the association organises yearly summer schools for teachers, every August, in the French Alps (near Gap). During one week, The days are divided into three main parts. In the mornings, courses on astronomical concepts are given (spatial and time coordinates, Solar System, stellar evolution, galaxies and cosmology, etc.). In the afternoons, a panel of training through exercises and practical activities are proposed, which can be reproduced in classrooms. Recent examples are: measurement of the Earth radius by triangulation; building of simple instruments such as sundials, astrolabes, armillary spheres, spectroscopes (the participants keep their own realisations!); data analysis (Hertzsprung-Russell diagram, cepheid light curves, etc). Finally, night observations are

naturally organised, progressing from naked eye observations to the use of binoculars and telescopes, possibly equipped with web-cams or cameras.

Exceptional events, such as solar eclipses, planetary transits (Mercury or Venus) ... and the International Year of Astronomy, are naturally exploited to initiate new activities in schools. As an example, one can cite the pedagogical box which includes simple material allowing to reproduce physical experiences realised by Galileo and to build a refracting telescope similar to the one invented 400 years ago. More generally speaking, the pedagogical choices are based on scientific investigation and favours interdisciplinarity in order to reach a structured vision of the world.

2. Why CLEA in the XXIst century?

Since its creation, the opportunities for teachers to access formation in astronomy has strongly diversified, through internet, of course, but also by development of activities dedicated to teachers in French observatories.

In this context, the CLEA still offers unique opportunities, such as:

- allowing exchanges between teachers on a national level;
- offering contacts with astronomers for *isolated* schools (French observatories are far from being uniformly distributed on the territory !)
- playing the rôle of a privileged and recognized interlocutor in debates and elaboration of teaching programmes, evolution of pedagogy, etc.



Figure 1. The CLEA logo.