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Teaching climatology and climate change with low cost lab equipment

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Climate and global warming is one of the important issues focused in the Portuguese primary and secondary physical sciences curricula. Several different phenomena, highlighting the impact of human activities on the climate system, are orally presented and discussed with the students. However, we believe that this approach could be complemented with an appropriate selection of experimental/lab demonstrations to illustrate and demonstrate some of these processes of this theme.

In our teaching sessions open to the student community, we follow a simple approach which includes a presentation, a discussion and a demonstration of the most important heating/cooling processes of the Earth and its Atmosphere and the influence of the external and internal factors. The earth orbital parameters changes, the energy transfer, balance, spatial and temporal distribution as well as other Atmospheric processes (water phase changes, latent and sensible heat, the role of the wind and ocean currents) are presented and demonstrated, emphasizing the role of the ice sheets, vegetation, clouds, dust, water vapor and other greenhouse gases. The simple but instructive laboratorial activities made with day-to-day low-cost materials will be documented. Our experience reveals that the students are well motivated by this type of approach to learn the climate science. Furthermore, these activities can easily be developed by teachers and students as part of their programme activities.