



Atmospheric eddies in Science Centers – Connection between secondary school teaching and informal learning

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There are many atmospheric phenomena which can be taught in the frame of different subjects at secondary schools. Geography and environmental education characteristically deal with observable natural phenomena some of which can be modeled in a laboratory, but neither the exact (phenomenological) description nor the theoretical background of these phenomena are given in any of the curricula. These phenomena include atmospheric and marine vortices on a wide scale. The beauty and frightening effect of the vortices from dust devils and waterspouts to cyclones and hurricanes can be a great motivating force for the students to learn more about the physics of these phenomena.

It is well known that cyclically built curriculums can be very effectively used in teaching natural sciences, since it is worth beginning with the observation of the phenomena which can belong to the realm of descriptive subjects as geography and environmental science. Later on physics can serve with theoretical interpretation of the observed phenomena. For example in physics, after acquiring the basic knowledge about mechanics, vortices can be used as quantitative examples in lessons, where the quantitative description makes more understandable the explanations given earlier in the geography.

Since either a waterspout or a fire tornado can be easily demonstrated, eddies can also be a favorite topic for science centers and extracurricular physics events, experimental demonstration events (such as the well-known European Researchers' Night, the "Physics show" used to be organized in Baja, or the "Saturday of experiments" of Cluj Napoca), or even during a road show type physics demonstrations in high schools.

Studying vortices occurring in rotating containers can also provide an opportunity for students to understand the role of the forces governing the atmospheric processes – gravitational force, Coriolis force, and the friction force –, and to work independently under proper supervision.

In this presentation we provide a unified description of these vortices based on secondary school mathematics and try to show how can be connect the formal teaching in secondary schools with informal form of teaching using this topic.