



IWAL—An Interactive Weather Analysis Laboratory

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One of the core objectives of teaching at ETH is to strengthen research-oriented learning. IWAL, the Interactive Weather Analysis Laboratory, is a research-oriented and web-based tool which allows three-dimensional weather systems and their time-evolution to be studied in detail. The students can individually investigate a particular aspect of a certain weather system (e.g., extratropical cyclone or fronts) with their own rationale. The active learning and curiosity-driven approaches are key characteristics of IWAL, which also distinguish it from very useful but more static approaches.

An important pedagogical aspect of the setup of IWAL at ETH Zurich is that it offers access to analysis and forecast data from the European Centre for Medium-range Weather Forecasts (ECMWF), which allows the students to visually assess the quality of a model forecast over time and identify the structure and amplitude of forecast errors. Additionally, basic meteorological fields from the ERA-Interim dataset (1979-2014) are available within IWAL, and also global IR and WV satellite imagery from the recent few years.

Typically, IWAL offers two view ports, where the first corresponds to a horizontal cross-section of a meteorological field (e.g., geopotential height, precipitation) and the second to a vertical cross section (e.g., vertical wind speed, relative humidity). Zooming in and out into a target region is supported, and the resolution of the image is optimally adjusted. On request, a vertical profile can be opened as an extra viewport, where the location of the profile is intuitively defined. In addition to Eulerian diagnostics, IWAL also allows kinematic trajectories to be computed and added as an extra layer to the IWAL images. The order of the image layers can be adjusted according to need and their transparency can be varied.

The pedagogical benefit of IWAL could be established at several courses and practicals at ETH.