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A convection climatology of the inner alpine region based on radar and lightning data

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A convection climatology of the inner alpine region covering Western Austria and North Italy is generated from five years radar and lightning data. The Austrian thunderstorm nowcasting tool (A-TNT) is employed to identify and track convective cells based on a uniform MaxCAPPI composite and lightning intensity maps following the method of the thunderstorm tracking and nowcasting algorithm ec-TRAM [1]. The algorithm identifies and monitors regions of intense precipitation and lightning activity separately by analyzing sequential two-dimensional intensity maps of radar precipitation rates and lightning densities, respectively. Each data source is processed by a stand-alone identification and tracking procedure, where the two separate tracking results are combined to comprehensive "convective cells" in a subsequent, final step. With this approach lightning data is used as a second, independent and complementing data source to improve storm identification and tracking in those regions where radar data is not or poorly available and to compensate for occasional data failures. Furthermore, pure convective precipitation can be distinguished from thunderstorms which also exhibit electrical activity.

Intensive precipitation cells are identified based on the uniform radar MaxCAPPI composite of the core region which is generated at ZAMG on a 1 km X 1 km basic grid. Lightning data are provided by the European lightning detection network EUCLID (www.euclid.org). A-TNT is run with a temporal resolution of 5 minutes.

First results of the convection climatology will be presented. Regions of preferred storm initiation and dissipation are investigated with respect to diurnal and seasonal aspects as well as different storm classes. Due to the rather short data archive the work focus on the documentation of the current situation. The presented work is performed within the framework of the INTERREG IV project 'Past, Present and Perspective Climate of Tirol, South Tyrol-Alto Adige and Veneto' (3PClim).

[1] Meyer, V. K., Höller, H., and Betz, H. D.: Automated thunderstorm tracking: utilization of three-dimensional lightning and radar data, Atmos. Chem. Phys., 13, 5137-5150, doi:10.5194/acp-13-5137-2013, 2013.