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PARALLEL SESSION A : BENEFITS OF DOWNSCALING
A3: FROM DATA TO INFORMATION - A DISTILLATION DILEMMA

From (big)data to information visualization with birdhouse: a collection of Web Processing Services

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Creating robust climate change information messages from multiple, distributed sources requires workflows capable of handling various technical and computational challenges. Data access, download or storage and diverse data/metadata formats, etc. can be workflow bottlenecks. Appropriate statistical methods for robust results are currently not centralized, thus analysis scripts are often produced in-house. This unnecessarily “re-invents the wheel” and proliferates unstandardized workflows that lack common benchmarks. Also, we underutilize the wide range of powerful interactive visualization tools increasingly available. These include JavaScript libraries and their Python/R derivatives that allow e.g. dimensional filtering of large datasets, and web map services that provide “slippy maps” from NetCDF files at different resolutions on the fly.

We present birdhouse, a growing collection of web processing services (WPS) and web mapping services for data access, analysis and visualization connected with standard protocols over HTTP. This enables data processing close to data archives such as ESGF, reducing data transport, and the modular architecture allows data processing with a variety of methods that can be shared and combined.

Birdhouse consists of "birds" (Python-based WPS components) to simplify the usage of WPS in the climate science context. For example, Malleefowl simplifies the access of NetCDF files from Thredds catalogues (ESGF). Flyingpigeon contains a collection of climate analysis algorithms and impact models as well as basic operations like extraction of polygon subsets from a grid. Phoenix is a web user interface to run WPS processes with an easy-to-use data selection component. Finally, there is Birdy, a command-line tool to interact with WPS processes.

To illustrate a full workflow, we present a use case based on bias-adjusted CORDEX and EOBS observation data to calculate extreme weather events in Europe. Birdhouse modules were used to calculate the means over 251 European regions of a selection of climate indices in yearly and seasonal aggregates under 2 RCP scenarios for several models. After birdhouse processing, extreme events (below/above the 10th/90th percentile of EOBS data, reference period 1976–2005) were then visualized using dc.js to produce an interactive dashboard that can be filtered based on any of the dimensions, alone or in combination.

With such workflows, robust information of big data can be produced and visualized.

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