

Short Course ESS13
Tuesday, 29 Apr, 14:00–15:45 | Room 0.55
**The inverse Butterfly effect:
from chaos to FAIR (onsite only)**

Oral ESS12.7
Thursday, 01 May, 09:15–09:25 | Room -2.92
**Overcoming the challenges of
terminological diversity**

Oral ESS14.4
Friday, 02 May, 16:30–16:40 | Room -2.92
**Establishing a Terminology Service
for the Earth System Sciences**

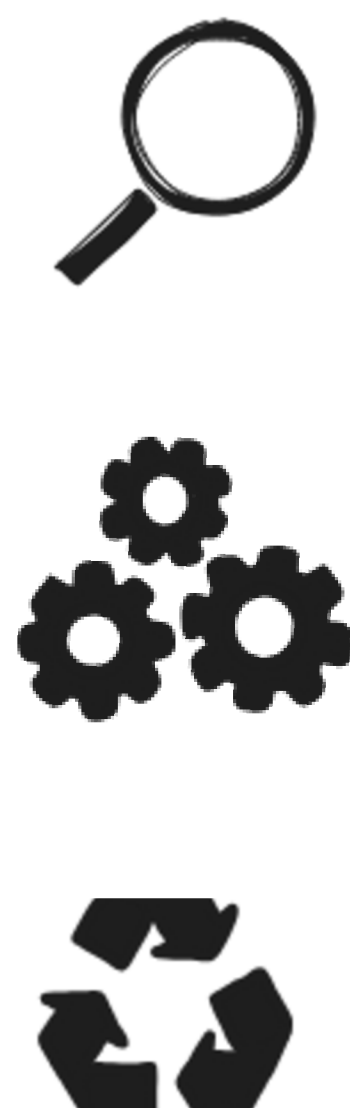
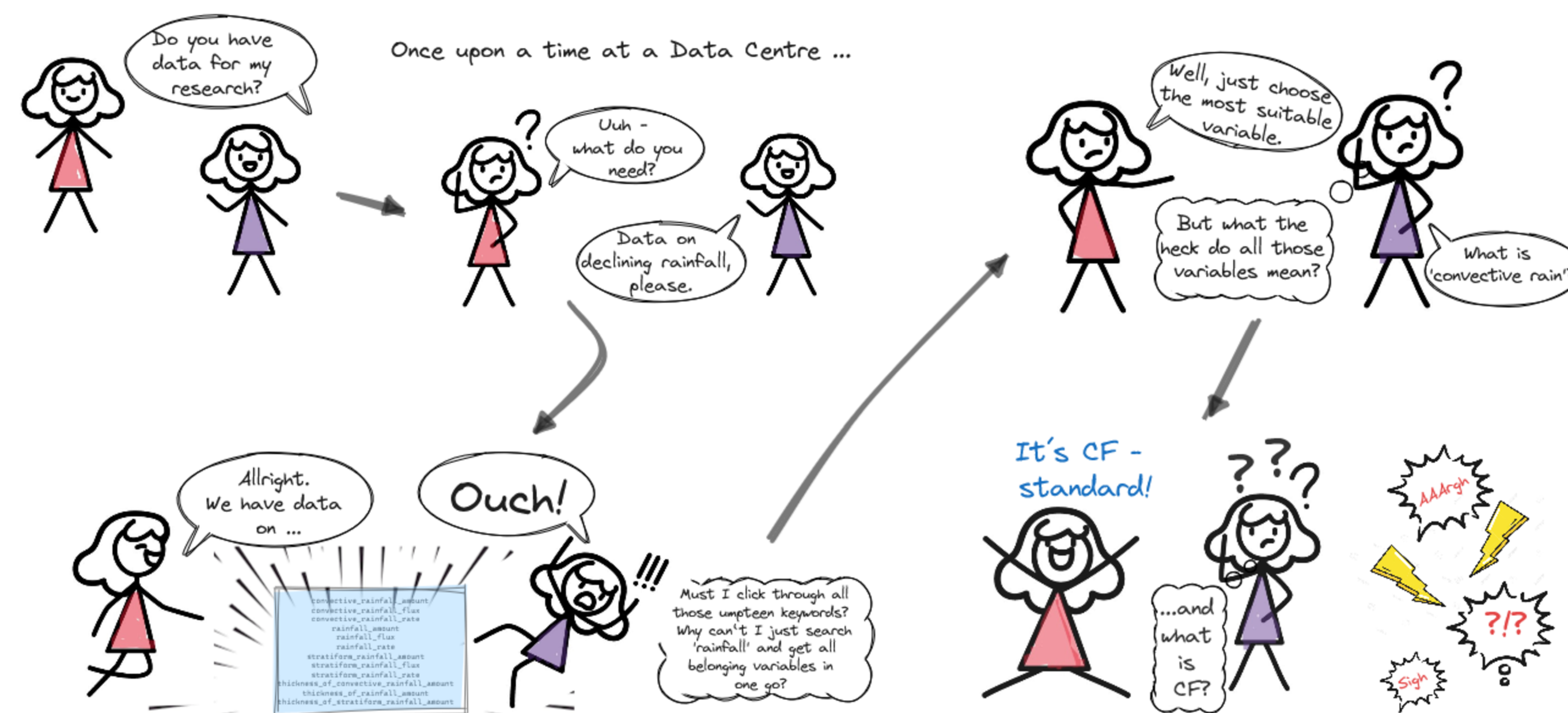
Oral ESS14.4
Friday, 02 May, 16:50–17:00 | Room -2.92
**World Data Center for Climate –
Repository for the Earth System Sciences**

Booth #18
DKRZ /
CEN /
ESMO

pain

Interdisciplinarity

The exponential growth of data due to technological developments along with an increased recognition of research data as relevant research output during the last decades substantiates fundamental challenges in terms of interoperability, reproducibility, and reuse of scientific information. The way to advance research in Earth System Sciences (ESS) depends on our ability to integrate highly diverse data across disciplines like paleontology, marine science, biodiversity research, atmospheric sciences, and molecular biology. Answering complex questions about our planet requires linking observations with simulations, and connecting data at very different scales - from single specimen images to petabyte-sized climate model outputs.



Different disciplines have developed their own methods and terms for indexing, cataloguing, describing, and retrieving scientific data, resulting in a large number of controlled vocabularies, taxonomies, thesauri, and ontologies. Those terminologies are often very helpful within their disciplines and well understood for those familiar with them. They can help by enabling researchers and infrastructure providers to realise machine-processable expressions of the information contained in their research data and other scholarly outputs.

The terminologies' specificity and heterogeneity, however, hampers the discoverability, interoperability, and reusability (the F, I, and R in FAIR data principles) across domains, as well as understanding by discipline strangers. It poses challenges for cross-disciplinary automated data processing, for analysis and reproducibility. As a countermeasure, mappings between their terms provide bridges among terminologies - and thus between scientific domains.

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Terminologies

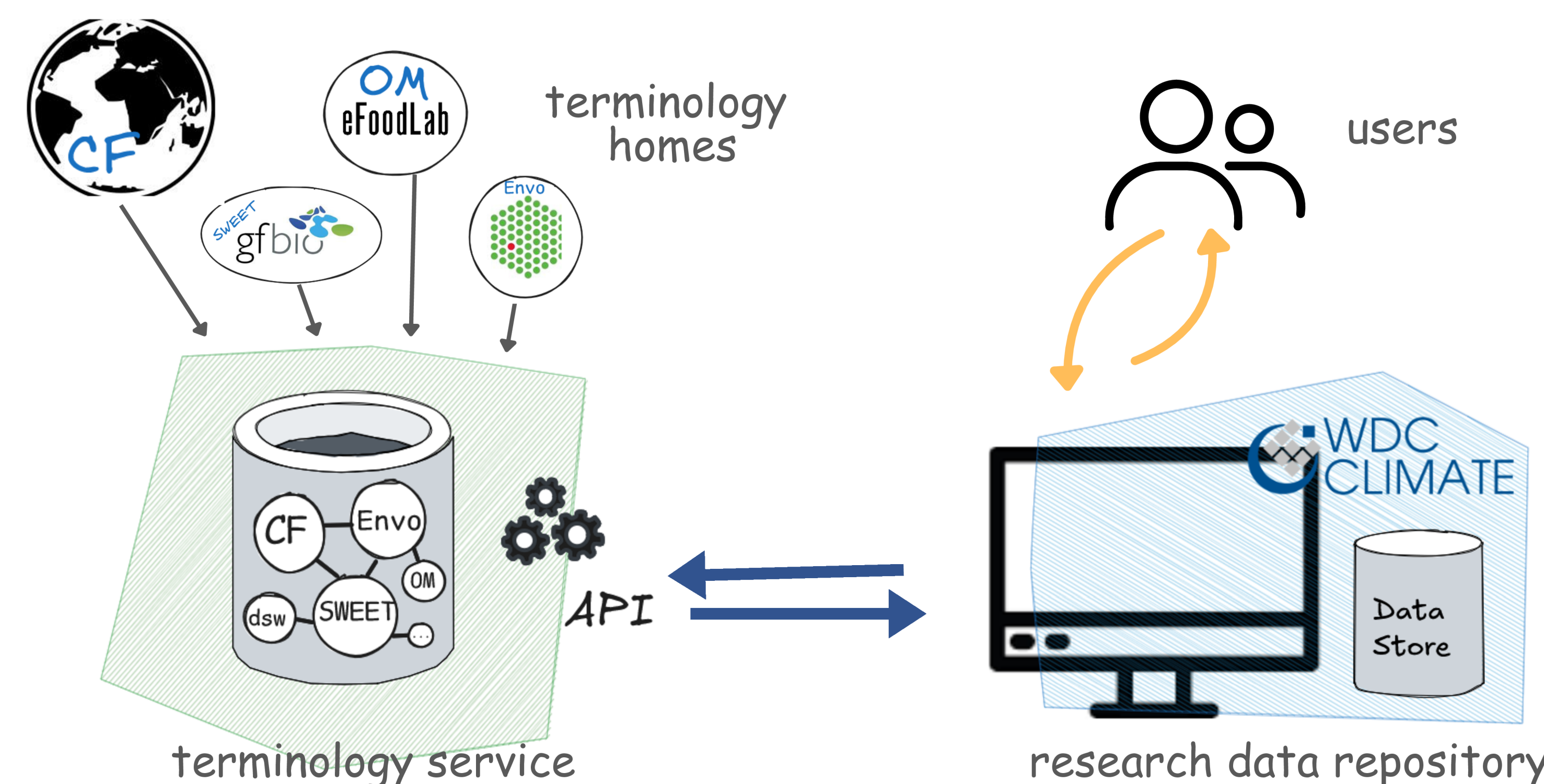
Terminologies foster concise legibility and ease cross-disciplinary data discovery and understanding with familiar languages and jargon. A terminology is part of the technical jargon of some scope, as e.g. a scientific discipline or an application area. It should be (continuously) maintained by scientific communities, avoiding redundancy and spelling variances. A terminology comprises the scope's set of terms, which may be structured by hierarchical (broader/narrower) or other interrelations between the terms. Sets of different terminologies in turn may be interrelated by mutual mappings between their terms. The individual terms might be accompanied by explanations as well as synonyms and multi-lingual translations. The terms ideally are identified and readable via HTTP URIs. Controlled vocabularies, taxonomies, thesauri, and ontologies constitute different kinds of terminologies with increasing structure or complexity, from simple listings over hierarchies to more complex structures.

Terminology Services

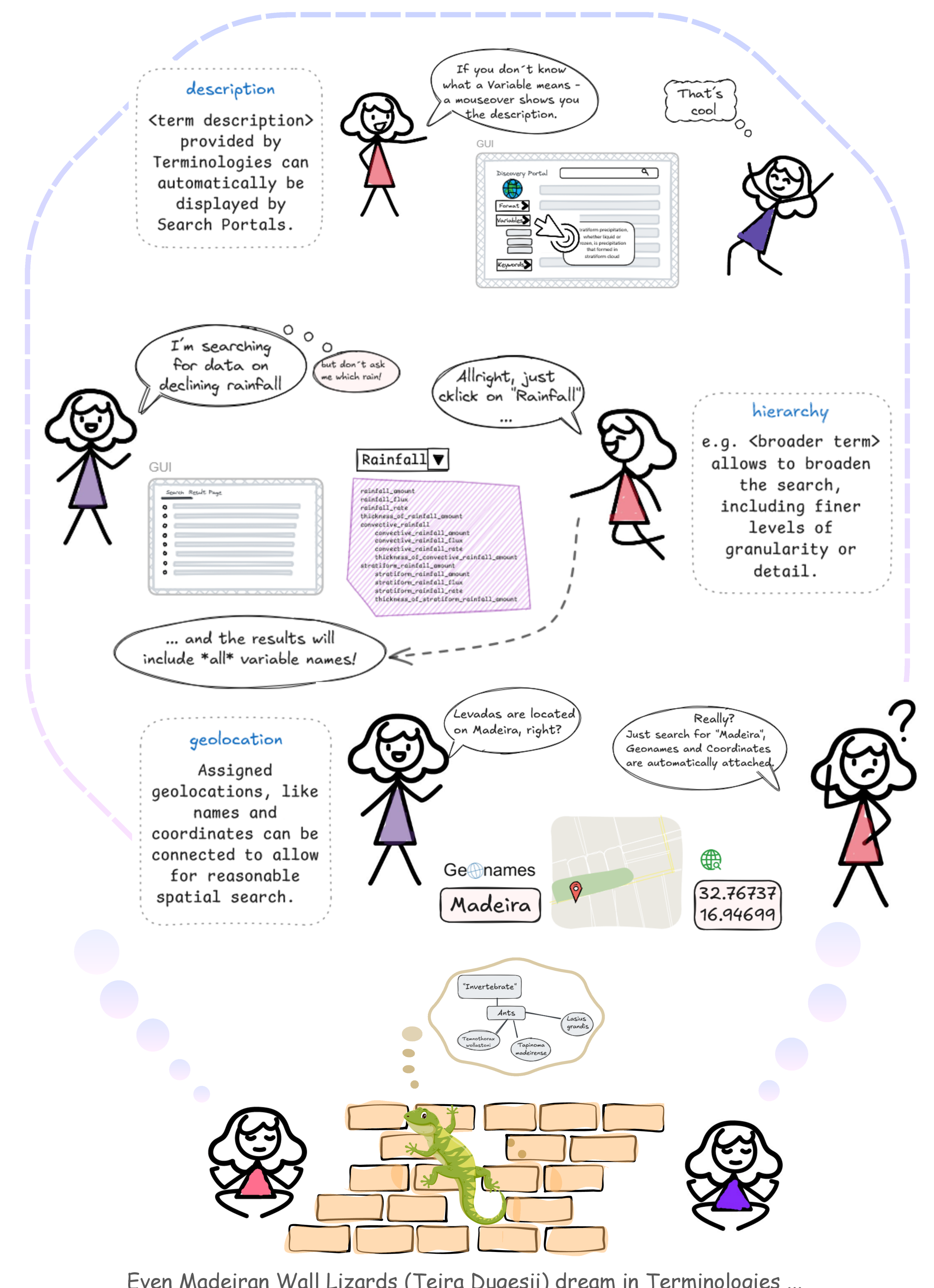
Terminology services (TS) allow for comfortable and sustainable use of terminologies. They pool terminologies at one place, neatly bundled in collections per discipline (or other criteria). Terminology Services provide access to the terminologies for both humans and platforms, i.e. via GUI and API. They offer means to comfortably inspect, query, view, and visualise individual terminologies and their terms and properties as well as their interrelations (within and between terminologies). To counteract loss or unavailability, TSs ensure sustainable preservation of terminologies across time and versions.

Usage

The World Data Center for Climate (WDCC) leverages terminologies and terminology services for improved search and description of research data - first uses cases are online, more will follow forthwith.



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The tediousness of (cross-domain) data discovery - in ESS as well as in other domains - can be relieved for users by leveraging (mapped) Terminologies within repositories. Implementing Terminologies in data repositories is again eased by Terminology Services (TS).

