

Work package number	2	Lead beneficiary	TARTU
Work package title	Causal knowledge discovery		
Participant number	6	7	
Short name of participant	EAWAG		TARTU
Person month per participant	9 (Provisional)		6 (Provisional)
Start month	7		
End month	30		

Objectives

- Develop a evolutionary-biology-AI inspired framework for causality discovery
- Derive functionality rules required for causality-based computation discovery
- Adaptive learning rules to mimic the empirical patterns for sustainability of the Seas

Description of work**Task T2.1: Develop eco-evolutionary dynamics modeling ... (M7-M24)***Leader:**EAWAG. Contributors: 6*

... T2.1 provides computation algorithms with evolving traits and interactions to allow WP2 to implement this feature in causal knowledge discovery. This is particularly relevant in Earth, Ecosystem and Sustainability science. The rapid progress of AI as an automated and explainable technology ([25, 18, 11, 20, 26, 16],+++) will increase our ability to make stronger inferences about future sustainability challenges and solutions [27]. Yet, eco-evolutionary biology-AI-inspired computation discovery solutions will be required to explore a broader range of scenarios with changing functions and **Carlos:Keep elaborating**

Task T2.2: This task extends T2.1 into evolutionary biology-inspired deep learning networks metrics for general principles of causal discovery (M7-M24)*Leader:**TARTU. Contributors: 8***Raul:Keep elaborating****Task T2.3: Based on the framework developed in T2.1 and T2.2, ICREA will derive automation rules for data discovery (M21-M27)***Leader: ICREA. Contributors: 3*

Automation rules [20] for evolutionary semantic algorithms and multilayer network metrics search and rules transformation for data discovery. **Roger:Keep elaborating**

Task T2.4: Reproduce (M21-M27)*Leader: SDSC. Contributors: 4*

In this task the SDSC will merge the work done in T2.1 and T2.2 into reproducible data knowledge graphs **Christine:Keep elaborating**

Task T2.5: Visualize (M21-M27)*Leader: SME. Contributors: 5*

In this task the partner SME will apply visualization algorithms to the work done in T2.1 and T2.2 **Charles and Miguel:Keep elaborating**

Task T2.6: All participants apply results from eco-evolutionary AI algorithms and deep learning networks into a fully automated, reproducible and animated sustainability of the Seas case study (M21-M30)*Leader: EAWAG. Contributors: 6,7,8,3,4,5*

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Deliverables**D2.1** Report on definition of eco-evolutionary biology-AI-inspired rules for causal discovery (**M18**)**D2.2** Report on definition of eco-evolutionary process-based deep learning networks applied to causal computation discovery (**M18**)**D2.3** Automated demonstrator of eco-evolutionary biology-AI-inspired rules for causal discovery (**M21**)**D2.4** Reproducible demonstrator of eco-evolutionary biology-AI-inspired rules for causal discovery (**M21**)**D2.5** Visualization demonstrator of evolutionary semantic rules for data discovery (**M21**)**D2.6** Demonstrator all parts for the sustainability exploitation of the Seas case study (**M24**)