

# Penelope climate change opinion observatory

ODYCCEUS online event 27/10



VUB Artificial Intelligence lab  
EHAi team



Tom Willaert, Katrien Beuls, Paul van Eecke, Jeroen Van Soest

# Agenda

1. Conceptual foundations of the observatory; context of the infrastructure that is being developed within the ODYCCEUS project
2. Closer look at the observatory and demonstration of some of its features

# Climate change opinion observatory

- A tool part of the Penelope ecosystem of modules and tools for computational social science, developed in the context of the H2020 ODYCCEUS project
- Objective: analyze aspects of the online discourse surrounding climate change by combining modules for data analysis

The screenshot displays the web application interface for the Climate Change Opinion Observatory. At the top, a navigation bar includes 'Home', 'Observatory', 'Manual', 'Example', and the user name 'Penelope'. The main content is divided into two sections: 'Pipeline' and 'Dashboard'.

**Pipeline:** This section shows a four-step process flow:

- Step 1:** 'Statement Graph', 'Count Named Entities', 'Causal Frames', 'Word tree', 'Term frequency', and 'Article Counts'.
- Step 2:** 'Statement graph', 'Plot Frame Distribution', and 'Plot Causal Map'.
- Step 3:** (Empty box)
- Step 4:** (Empty box)

**Dashboard:** This section contains two 'Dataset' views. The left view is for 'reddit askscience climate change 2019-1-1 2020-1-1 1000' and the right view is for 'reddit askscience climate change 2020-1-1 2020-3-30 193'. Both views include a search bar, an 'Export CSV' button, and a table with columns for 'Article date', 'Title', and 'Causal Relations'.

Article date	Title	Causal Relations
2019-01-02	askscience	though I live in an interglacial part of the Quaternary ice age (the ice age which started approximately 2.6 million years ago) as opposed to a full on glacial, in which there would be more extensive ice and lower average global temperatures. If anthropogenic climate change has disrupted the glacial-interglacial cycles such that we will not be entering another glacial period, which would have happened in the next few thousand years otherwise. Although the climate system is complex with many different feedbacks and nuances, CO2 is such a sensitive controlling factor for the greenhouse effect that our impact here has had profound results regardless of other secondary interactions. The pace of glacial-interglacial throughout the Quaternary ice age is thought to be largely controlled by variations in the Earth's orbit (known collectively as Milankovitch cycles) from <a href="https://en.wikipedia.org/wiki/Milankovitch_cycles">https://en.wikipedia.org/wiki/Milankovitch_cycles</a> . There are many other factors that can contribute though, such as concentration of greenhouse gases, variation in solar output, arrangement of the continents, ocean and atmosphere patterns, amount of dust in the atmosphere, ice-building mechanics etc. The reasons for variations in the Earth's orbit can be traced back to the fact that the Earth's orbit is affected by the gravitational pull of other planets in the solar system.
2019-01-02	askscience	On global scales, no, global warming will not increase seismicity. The impact of climate change is only on the order of a few degrees Celsius (at best) for humans. The part of temperature change is negligible in terms of affecting the properties of the crust; temperate climates see more extreme seasonal variations without any statistical change in seismicity. Furthermore, changes in air temperature don't affect ground temperatures below 20" deep. On local scales, yes, global warming could change seismicity by modifying precipitation rates and therefore groundwater behavior: increasing the groundwater pore pressure within a fault essentially decreases the friction within that fault; to a degree of groundwater from a heavy storm could lubricate a loaded fault and push it past the failure threshold. In a tectonic setting where faults are being actively loaded, an increase in interseismic heavy rainfall could significantly increase the rate at which earthquakes occur. Conversely, a persistent and static increase in groundwater pore pressure could serve to perpetually lubricate a fault, allowing it to slip aseismically; that is, the opposing walls of the fault slide past each other aseismically.

Article date	Title	Causal Relations
2020-01-02	askscience	Climate change is affecting migration. Birds are returning to where I live about 7 days earlier than they did in 1990. This means their spring food tree buds and things have had 7 fewer days to emerge, meaning food quality is poorer and starvation is more likely.
2020-01-02	askscience	Yes but also no. There are also adapting to climate change but... but because... there live much longer hundreds of years and this helps them survive. Slower and slower the change will happen more slowly for trees than for birds. At times the trees are: in up sensitive bird species may already be extirpated from that area. In addition, the range of some trees is slowly migrating north, so birds that return to an area like mine, which is right on the border between temperate and boreal forests may, at some point return to find that the boreal trees they use as a food source no longer grow there. Generalist species may be able to eat from the temperate trees that move into that zone, but species who rely on specific boreal trees cannot.

# Climate change opinion observatory

Focus on the study of societal and cultural conflict based on online (social) media texts

- Which actors are described in the texts?
- Which events are discussed?
- How do debates and conflicts develop?

This study of conflict maps onto an analysis of narratives and the different components of those narratives:

- Which characters figure in the text?
- What is the plot?
- How does the narrative progress over time?

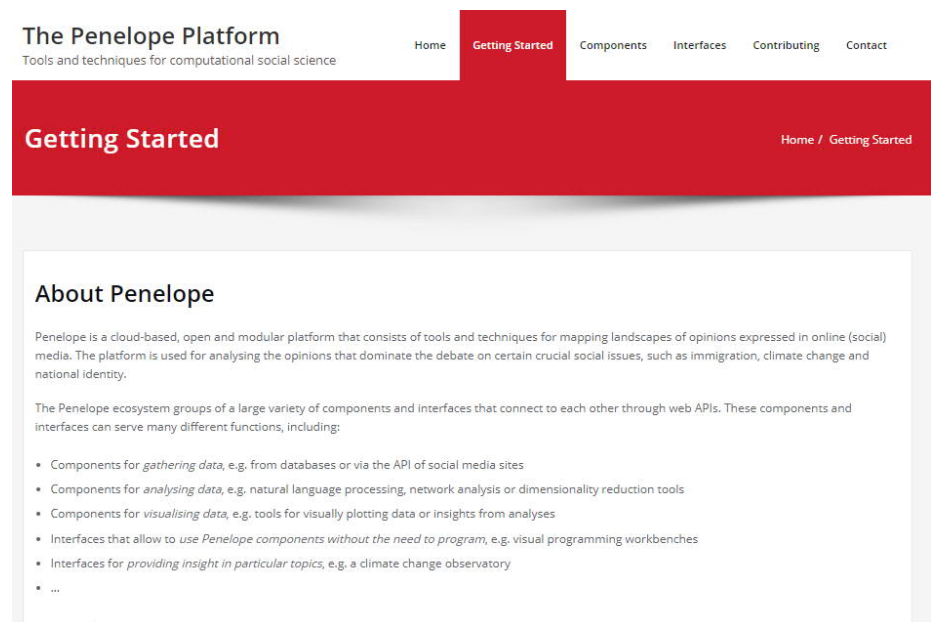
# ODYCCEUS

- Opinion dynamics and cultural conflict in European spaces
- The project seeks conceptual breakthroughs in global systems science, including a fine-grained representation of cultural conflicts based on conceptual spaces and sophisticated text analysis, extensions of game theory to handle games with both divergent interests and divergent mindsets, and new models of alignment and polarization dynamics.
- ~ methods, tools, artisanship



# Penelope

- Penelope is a cloud-based, open and modular platform that consists of tools and techniques for mapping landscapes of opinions expressed in online (social) media. The platform is used for analyzing the opinions that dominate the debate on certain crucial social issues, such as immigration, climate change and national identity.



The Penelope Platform  
Tools and techniques for computational social science

Home **Getting Started** Components Interfaces Contributing Contact

Getting Started Home / Getting Started

## About Penelope

Penelope is a cloud-based, open and modular platform that consists of tools and techniques for mapping landscapes of opinions expressed in online (social) media. The platform is used for analysing the opinions that dominate the debate on certain crucial social issues, such as immigration, climate change and national identity.

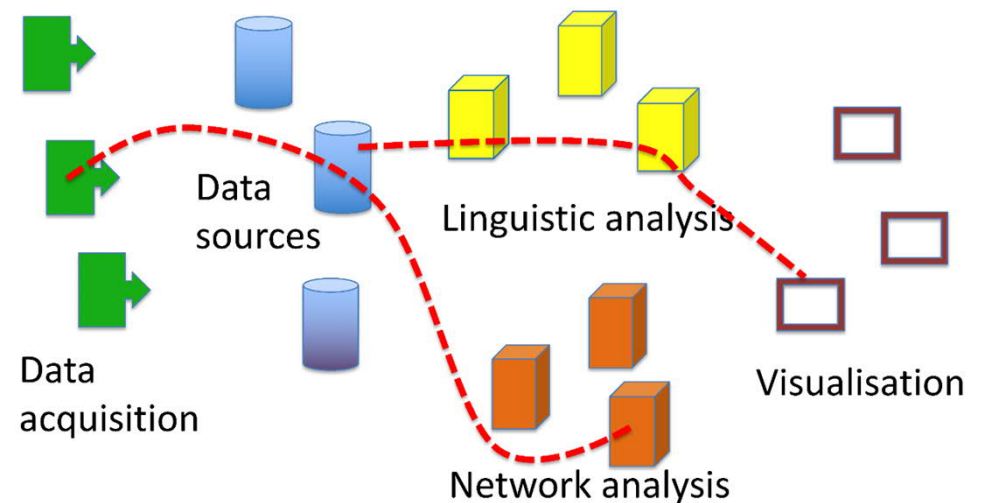
The Penelope ecosystem groups of a large variety of components and interfaces that connect to each other through web APIs. These components and interfaces can serve many different functions, including:

- Components for *gathering data*, e.g. from databases or via the API of social media sites
- Components for *analysing data*, e.g. natural language processing, network analysis or dimensionality reduction tools
- Components for *visualising data*, e.g. tools for visually plotting data or insights from analyses
- Interfaces that allow to *use Penelope components without the need to program*, e.g. visual programming workbenches
- Interfaces for *providing insight in particular topics*, e.g. a climate change observatory
- ...

Community website: <https://penelope.vub.be/>

# Penelope

- The Penelope ecosystem consists of modules and tools
  - Modules = individual components that can be chained together into larger analyses, available as web services
  - Tools = more elaborate analytical instruments, often with a user interface, which depend on one or more Penelope modules



SMARTBEAR  
SwaggerHub

SIGN UP LOG IN

Semantic-Frame... 1.0.0

Export

Info

Tags

Search

penelope ^

POST /extract-frames

POST /texts-extract-frames

Models ^

MODEL extractFramesQuery

MODEL extractFramesResponse

MODEL textsExtractFramesQuery

MODEL textsExtractFramesResponse

```

1 swagger: "2.0"
2 info:
3   description: |
4     This API specification documents the Semantic Frame Extractor developed and
5     hosted by
6     [Evolutionary and Hybrid AI (EHAI)](https://know.ai.vub.ac.be) research
7     group of the [VUB AI-Lab](https://ai.vub.ac.be).
8   version: 1.0.0
9   title: Semantic Frame Extractor
10  contact:
11    email: ehai@ai.vub.ac.be
12  license:
13    name: Apache 2.0
14    url: http://www.apache.org/licenses/LICENSE-2.0.html
15 tags:
16 - name: penelope
17   description: Operations that satisfy the Penelope requirements
18 host: penelope.vub.be
19 basePath: /semantic-frame-extractor/
20 schemes:
21 - https
22 paths:
23   /extract-frames:
24     post:
25       tags:
26       - penelope
27       summary: Extracts the semantic frames from a sentence
28       operationId: extractFrames
29       description: Extracts the semantic frames from a sentence
30       consumes:
31       - application/json
32       produces:
33       - application/json
34       parameters:
35       - in: body
36         name: extractFramesQuery
37         description: Query
38         schema:
39         $ref: '#/definitions/extractFramesQuery'
40
41

```

Read Only

## Semantic Frame Extractor

1.0.0

[ Base URL: penelope.vub.be/semantic-frame-extractor/ ]

This API specification documents the Semantic Frame Extractor developed and hosted by Evolutionary and Hybrid AI (EHAI) research group of the VUB AI-Lab.

[Contact the developer](#)

Apache 2.0

Schemes

HTTPS

penelope Operations that satisfy the Penelope requirements

POST /extract-frames Extracts the semantic frames from a sentence

POST /texts-extract-frames Extracts the semantic frames the sentences in a list of texts

Models

extractFramesQuery

Last Saved: 4:36:38 pm - Dec 20, 2018

VALID

https://app.swaggerhub.com/apis/EHAI/Semantic-Frame-Extractor-API/1.0.0



# The Penelope shelf

- The Penelope shelf offers an overview of available modules and tools
  - Links
  - Authors
  - Classification by keyword
  - How to cite
  - List of tools using module
  - List of projects using module or tool



UNIVERSITY OF AMSTERDAM

## PENELOPE

[about](#) [contribute](#)

### CLIMATE CHANGE OPINION OBSERVATORY ⊗

Interface intended to allow citizens to monitor and visualize the dynamics of conflict situations that are taking place in the debate about climate change. The website offers users the flexibility to chain together data analytics components developed in the ODYCCEUS project into custom pipelines.

uses modules  
Spacy Natural Language Processing Tools

keywords  
NLP  
OBSERVATORY  
CLIMATE CHANGE  
SOCIAL MEDIA  
REDDIT  
THE GUARDIAN  
PIPELINE

#### HOW TO CITE

Willaert, T., Van Eecke, P., Beuls, K., & Steels, L. (2020). Building Social Media Observatories for Monitoring Online Opinion Dynamics. *Social Media + Society*. Sage Journals.  
<https://doi.org/10.1177/2056305119898778>

#### LINK

<https://penelope.vub.be/observatories/climate-change-opinion-observatory/>

#### PROJECTS USING THIS TOOL



[Building Social Media Observatories for Monitoring Online Opinion Dynamics](#)

authors  
TOM WILLAERT  
PAUL VAN EECKE  
KATRIEN BEULS  
JEROEN VAN SOEST

# Modules

**PENELOPE**

[about](#) [contribute](#)

view as	GRID 	NETWORK 
show	MODULES	TOOLS
selected filters	<a href="#">clear all</a>	
filter by keywords	▼	
filter by authors	▼	

<p>#</p> <p><b>4CAT: Capture and Analysis Toolkit</b></p> <p>4CAT: Capture and Analysis Toolkit is a tool that can be used to scrape incoming posts on various forums,...</p>	<p>c</p> <p><b>Climate Change Opinion Observatory</b></p> <p>Interface intended to allow citizens to monitor and visualize the dynamics of conflict situations tha...</p>	<p>g</p> <p><b>Guardian Climate Change Data API</b></p> <p>Penelope's Guardian Climate Change Data Web API allows you to retrieve articles and reader...</p>	<p>m</p> <p><b>Margot Argument Miner</b></p> <p>Argument mining refers to the automated analysis of unstructured textual documents with the goal of...</p>
<p>n</p> <p><b>Network Tools</b></p> <p>This component provides network science related tools to the Penelope ecosystem: Statement...</p>	<p>p</p> <p><b>Parliament Dataset API</b></p> <p>Penelope's Parliament Data Web API allows to retrieve speeches from parliamentary discussions...</p>	<p>r</p> <p><b>Reddit language propagation observatory</b></p> <p>This observatory visualizes the propagation of words across subreddits on reddit.com over tim...</p>	<p>s</p> <p><b>Spacy Natural Language Processing Tools</b></p> <p>This component provides access to a wide variety of natural language processing (NLP) tools:...</p>
<p>Space-time modelisation of international news flow</p> <p>This tool proposes a quantitative model of the circulation of foreign news based on a gravity-like model...</p>	<p>t</p> <p><b>twitter explorer</b></p> <p>An open-source interface for scientists to explore Twitter data through interactive network...</p>		

# Modules

PENELOPE

about

contribute

## GUARDIAN CLIMATE CHANGE DATA API



Penelope's Guardian Climate Change Data Web API allows you to retrieve articles and reader comments from The Guardian newspaper that are tagged for climate change. You can also search through articles and comments using regular expressions.

used by tools

4CAT: Capture and Analysis Toolkit

keywords

THE GUARDIAN  
NEWSPAPERS  
CLIMATE CHANGE

authors

EHAI – VRIJE  
UNIVERSITEIT BRUSSEL

HOW TO CITE

LINK

<https://app.swaggerhub.com/apis/EHAI/GuardianClimateChangeData/1.0.0>

PROJECTS USING THIS MODULE

No projects listed

# Modules

PENELOPE

about

contribute

## SPACY NATURAL LANGUAGE PROCESSING TOOLS



This component provides access to a wide variety of natural language processing (NLP) tools: Tokenization, Lemmatization, Noun chunking, Part-of-speech tagging, Named entity recognition, Dependency parsing, Word embeddings, Sentencization

With each API call, these tools can analyse either a single sentence or an array of text documents (for faster performance). The tools are available in 6 languages (en, de, es, pt, it, nl, fr). The NLP tools rely on the Spacy Python library.

The OpenAPI specification is available at <https://app.swaggerhub.com/apis/EHAI/vub-spacy-services/1.0.0>

### HOW TO CITE

Honnibal, M., & Montani, I. (2017). spaCy 2: Natural language understanding with Bloom embeddings, convolutional neural networks and incremental parsing.

### LINK

<https://app.swaggerhub.com/apis/EHAI/vub-spacy-services/1.0.0>

### PROJECTS USING THIS MODULE

[Climate Change Opinion Observatory](#)

### used by tools

Climate Change Opinion Observatory  
Space-time modelisation of international news flow

### keywords

NLP  
NAMED ENTITY RECOGNITION  
SPACY  
SENTENCIZATION  
WORD EMBEDDINGS  
DEPENDENCY PARSING  
PART-OF-SPEECH TAGGING  
TOKENIZATION  
LEMMATIZATION  
NOUN CHUNKING

### authors



PAUL VAN EECKE

# Overview of tools

**PENELOPE**

[about](#)

[contribute](#)

view as   GRID  NETWORK 							
show   MODULES   TOOLS							
selected filters <span style="float: right;">clear all</span>							
filter by keywords <span style="float: right;">▼</span>							
filter by authors <span style="float: right;">▼</span>							
#	<b>4CAT: Capture and Analysis Toolkit</b>	c	<b>Climate Change Opinion Observatory</b>	g	<b>Guardian Climate Change Data API</b>	m	<b>Margot Argument Miner</b>
	4CAT: Capture and Analysis Toolkit is a tool that can be used to scrape incoming posts on various forums,...		Interface intended to allow citizens to monitor and visualize the dynamics of conflict situations tha...		Penelope's Guardian Climate Change Data Web API allows you to retrieve articles and reader...		Argument mining refers to the automated analysis of unstructured textual documents with the goal of...
n	<b>Network Tools</b>	p	<b>Parliament Dataset API</b>	r	<b>Reddit language propagation observatory</b>	s	<b>Spacy Natural Language Processing Tools</b>
	This component provides network science related tools to the Penelope ecosystem: Statement...		Penelope's Parliament Data Web API allows to retrieve speeches from parliamentary discussions...		This observatory visualizes the propagation of words across subreddits on reddit.com over tim...		This component provides access to a wide variety of natural language processing (NLP) tools:...
	<b>Space-time modelisation of international news flow</b>	t	<b>twitter explorer</b>				
	This tool proposes a quantitative model of the circulation of foreign news based on a gravity-like model...		An open-source interface for scientists to explore Twitter data through interactive network...				



Climate change opinion observatory