

# Creating Open Knowledge Graph for Climate

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SHWEATA HEGDE AND #SC TEAM

2025-02-15



@shweataHegde



Shweata N. Hegde

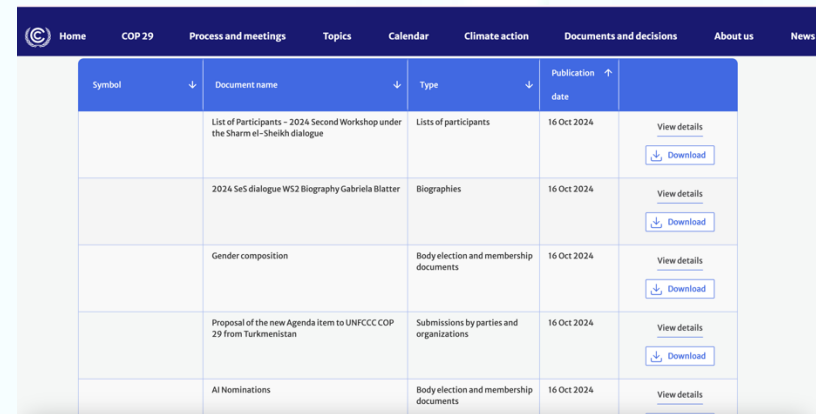


<https://semanticclimate.github.io/p/en/>

# So much climate knowledge!

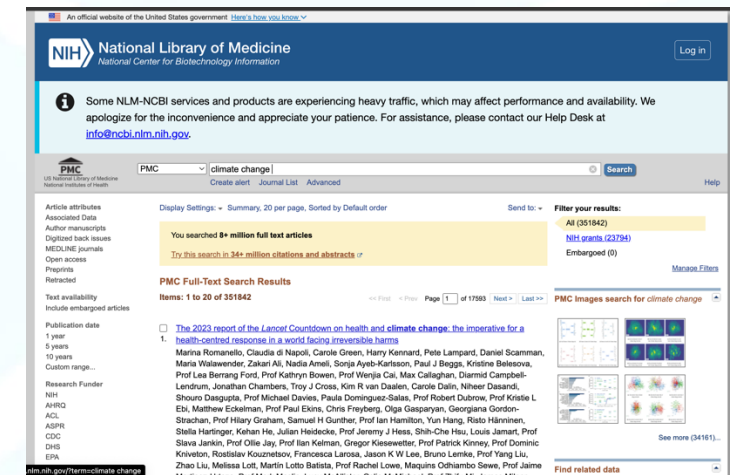


IPCC Reports  
(10000+ pages)

The image shows a screenshot of the UNFCCC Documents and Decisions page. It contains a table with columns for Symbol, Document name, Type, Publication date, and actions (View details, Download).

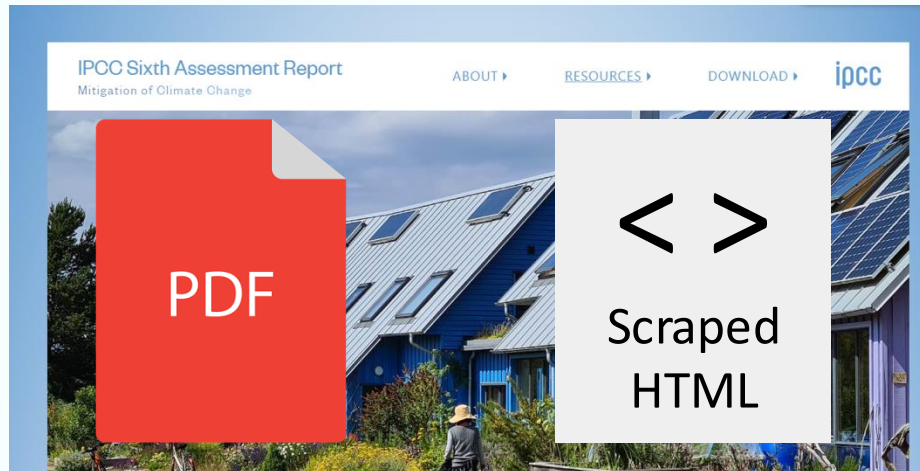
Symbol	Document name	Type	Publication date	
	List of Participants – 2024 Second Workshop under the Sharm el-Sheikh dialogue	Lists of participants	16 Oct 2024	<a href="#">View details</a> <a href="#">Download</a>
	2024 Set dialogue WS2 Biography Gabriela Blatter	Biographies	16 Oct 2024	<a href="#">View details</a> <a href="#">Download</a>
	Gender composition	Body election and membership documents	16 Oct 2024	<a href="#">View details</a> <a href="#">Download</a>
	Proposal of the new Agenda item to UNFCCC COP 29 from Turkmenistan	Submissions by parties and organizations	16 Oct 2024	<a href="#">View details</a> <a href="#">Download</a>
	AI Nominations	Body election and membership documents	16 Oct 2024	<a href="#">View details</a>

UNFCCC Documents  
(1000 Pages)

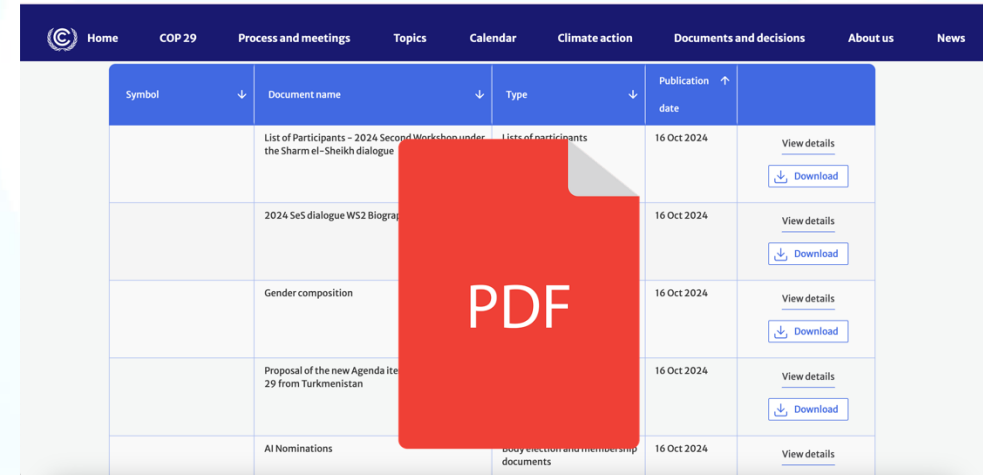


Scientific literature

# PDFs are not sustainable (1-star); knowledge locked up; cause massive wastage



IPCC Reports  
(10000+ pages)

The image shows a screenshot of the UNFCCC Documents website. It features a table with columns for 'Symbol', 'Document name', 'Type', 'Publication date', and 'View details'. A red icon representing a PDF file is overlaid on the right side of the table.

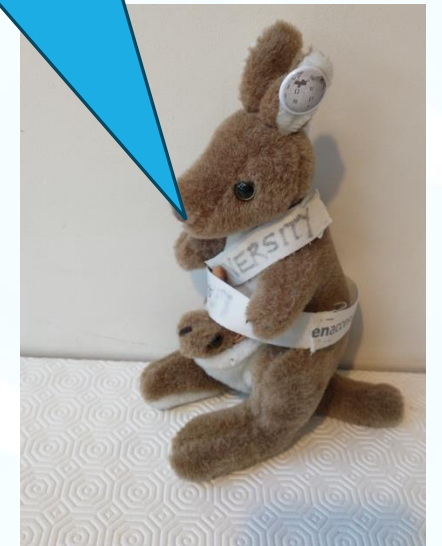
Symbol	Document name	Type	Publication date	View details
	List of Participants - 2024 Second Workshop under the Sharm el-Sheikh dialogue	List of participants	16 Oct 2024	<a href="#">View details</a> <a href="#">Download</a>
	2024 SeS dialogue WS2 Biograp		16 Oct 2024	<a href="#">View details</a> <a href="#">Download</a>
	Gender composition		16 Oct 2024	<a href="#">View details</a> <a href="#">Download</a>
	Proposal of the new Agenda item 29 from Turkmenistan		16 Oct 2024	<a href="#">View details</a> <a href="#">Download</a>
	AI Nominations	body election and membership documents	16 Oct 2024	<a href="#">View details</a>

UNFCCC Documents  
(1000 pages)

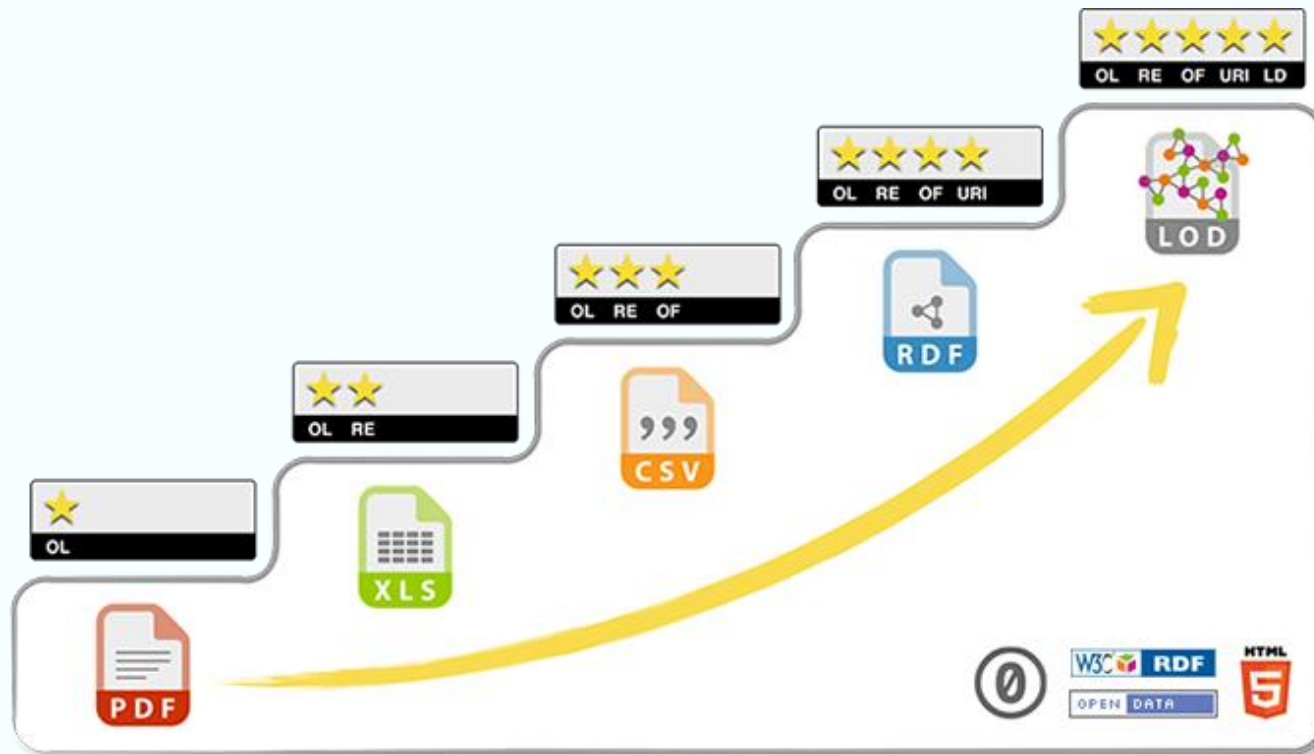
AMI, need your help. What do we do with these PDF?



You've come to the right person, Chuff. I can turn the PDFs into a semantic 5-star documents so the knowledge is usable



# What Do We Mean by 5-star Document?



*Tim Berners-Lee's Classification*

5-star: Semantic HTML  
+ Unique Identifiers +  
Annotation

# Our Mission

To create verifiable computable climate knowledge  
(5-star-documents)

we take the following as verifiable sources of truth

- ⌘ IPCC framework (PDF or web-HTML)
- ⌘ UNFCCC reports (COPs)
- ⌘ 1000/week scholarly climate publications

# Framework of IPCC Reports

## Reports

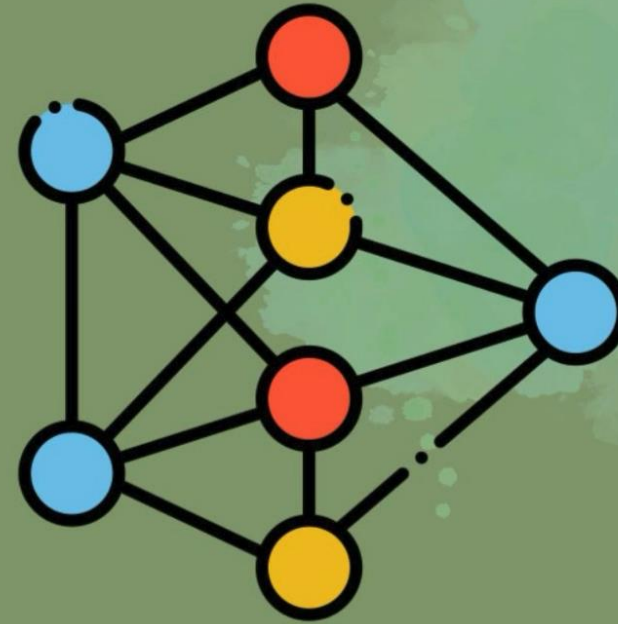
- 3 Working Groups (WG1, WG2, WG3)
- Several Special Reports
- Synthesis Report
- 20,000 pages of PDF => HTML
- 1000 figure captions
- 15000+ bibliography
- 700-term Glossary
- 1500 acronyms

We make all these semantic  
(machine parsable into structured,  
annotated data).



# Climate Knowledge Graph

Networks of  
IPCC  
Working  
Groups

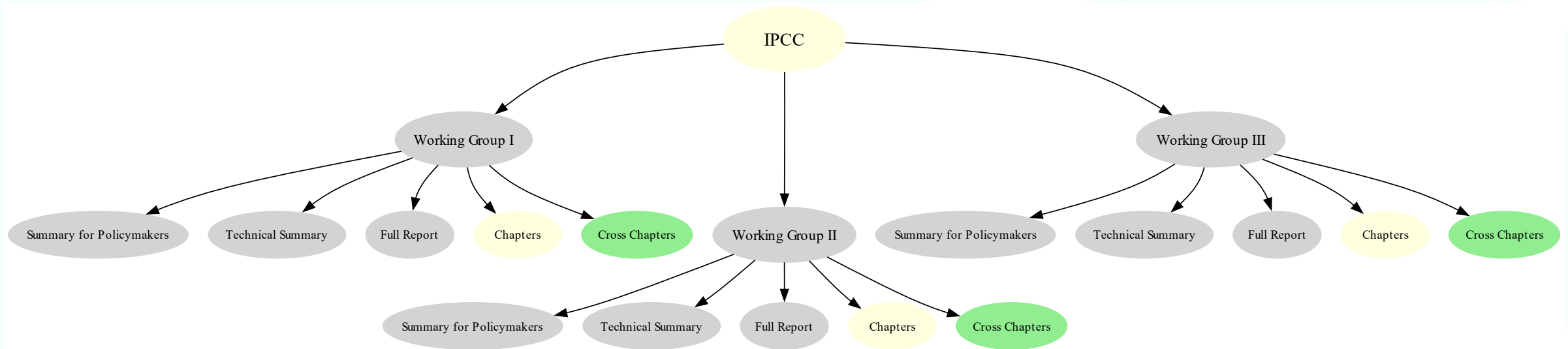


By Team  
semanticClimate

~ Sharon

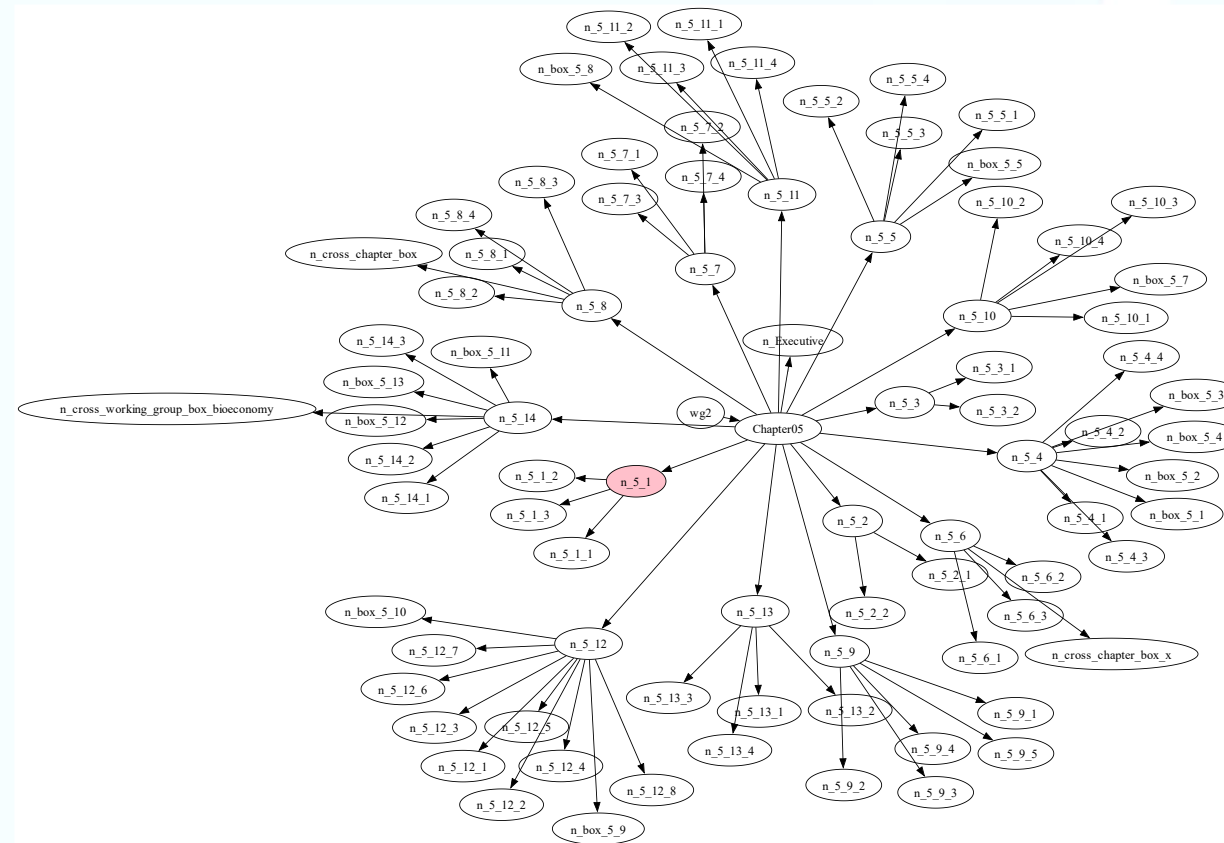


# #semanticClimate's IPCC Knowledge Graph (HTML and SVG)



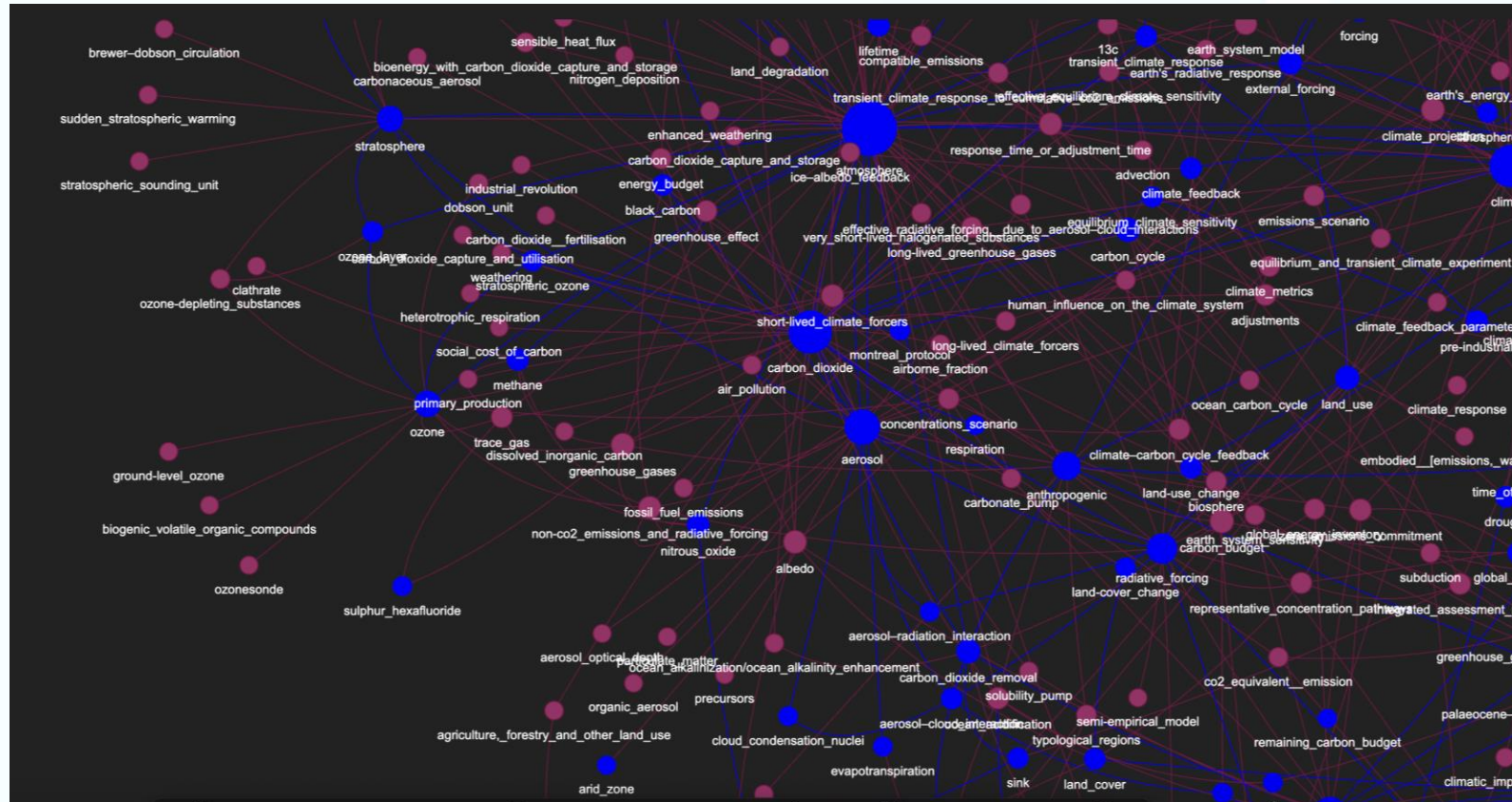
Anudev, Shabnam and Sharon (Present Interns)

# Knowledge Graph of WG2/Chapter 05



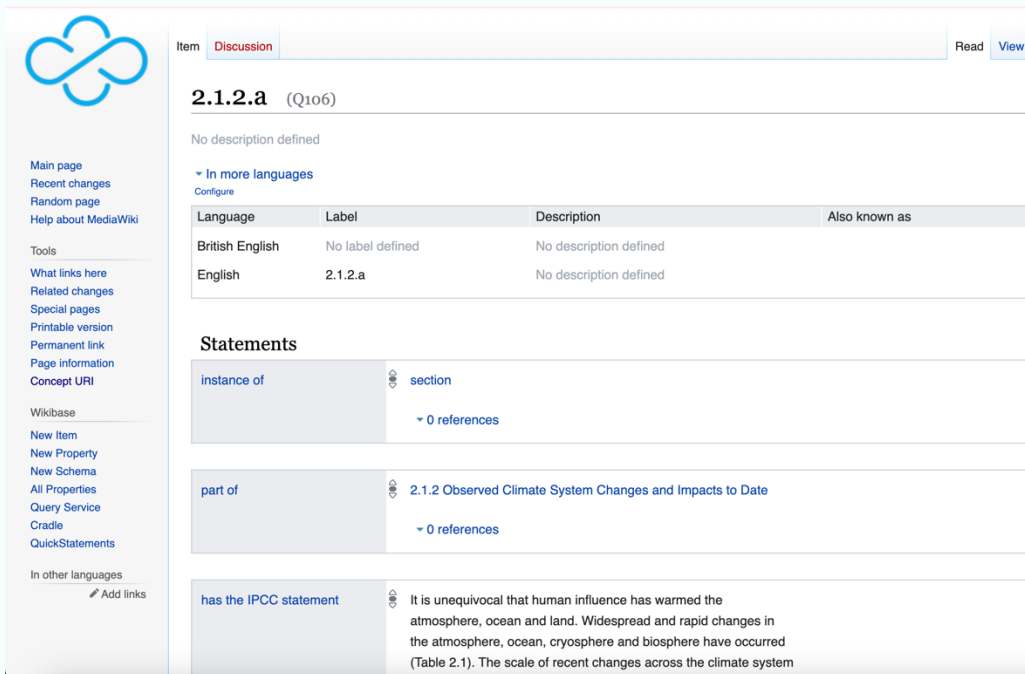
[https://raw.githubusercontent.com/petermr/amilib/refs/heads/pmr\\_aug/temp/ipcc/wg2/Chapter05/toc.fdp.svg](https://raw.githubusercontent.com/petermr/amilib/refs/heads/pmr_aug/temp/ipcc/wg2/Chapter05/toc.fdp.svg)

# Glossary Knowledge Graph



[IPCC Glossary](#)

# Wikibase for Climate Knowledge



Item **Discussion** Read View

## 2.1.2.a (Q106)

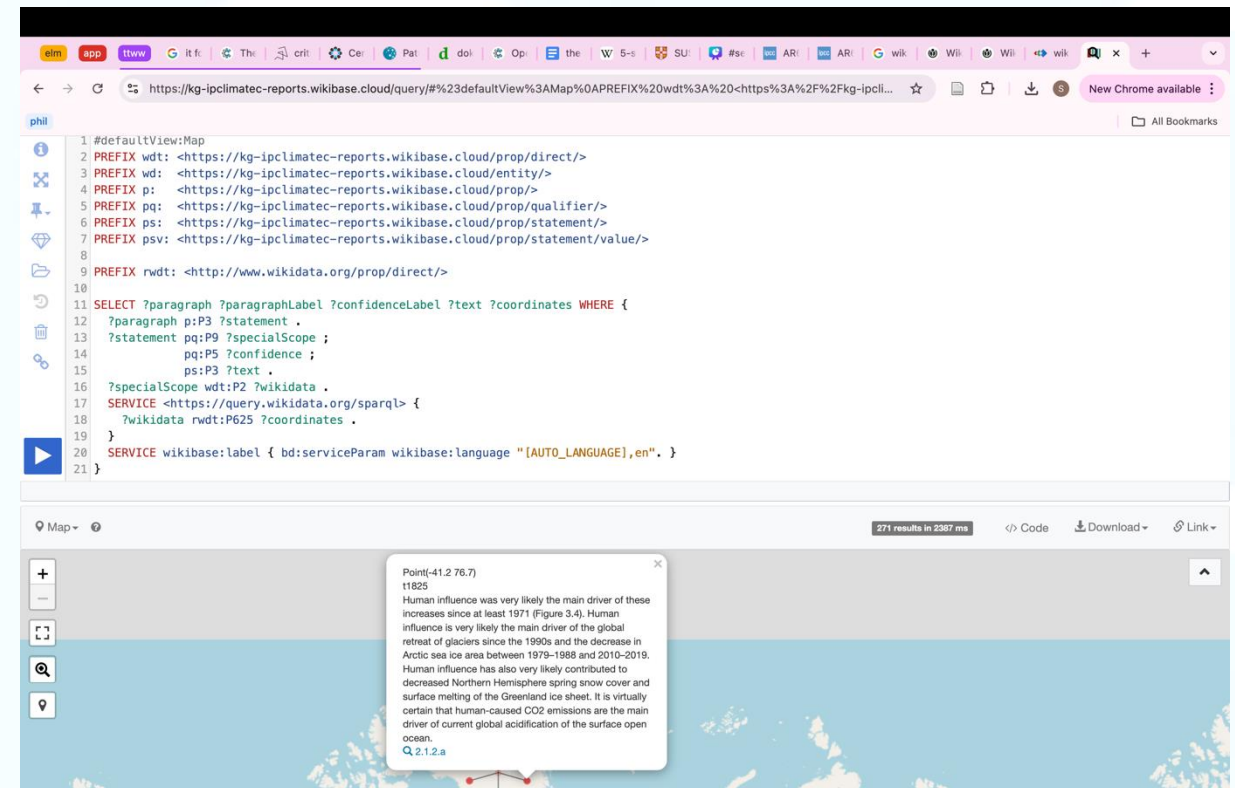
No description defined

**In more languages**

Language	Label	Description	Also known as
British English	No label defined	No description defined	
English	2.1.2.a	No description defined	

### Statements

- instance of section 0 references
- part of 2.1.2 Observed Climate System Changes and Impacts to Date 0 references
- has the IPCC statement It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred (Table 2.1). The scale of recent changes across the climate system



```

1 #defaultView:Map
2 PREFIX wdt: <https://kg-ipclimatec-reports.wikibase.cloud/prop/direct/>
3 PREFIX wd: <https://kg-ipclimatec-reports.wikibase.cloud/entity/>
4 PREFIX p: <https://kg-ipclimatec-reports.wikibase.cloud/prop/>
5 PREFIX pq: <https://kg-ipclimatec-reports.wikibase.cloud/prop/qualifier/>
6 PREFIX ps: <https://kg-ipclimatec-reports.wikibase.cloud/prop/statement/>
7 PREFIX psv: <https://kg-ipclimatec-reports.wikibase.cloud/prop/statement/value/>
8
9 PREFIX rwdt: <http://www.wikidata.org/prop/direct/>
10
11 SELECT ?paragraph ?paragraphLabel ?confidenceLabel ?text ?coordinates WHERE {
12   ?paragraph p:P3 ?statement .
13   ?statement pq:P9 ?specialScope ;
14             pq:P5 ?confidence ;
15             ps:P3 ?text .
16   ?specialScope wdt:P2 ?wikidata .
17   SERVICE <https://query.wikidata.org/sparql> {
18     ?wikidata rwdt:P625 ?coordinates .
19   }
20   SERVICE wikibase:label { bd:serviceParam wikibase:language "[AUTO_LANGUAGE],en". }
21 }

```

Map

271 results in 2387 ms

Code Download Link

Point(-41.2 76.7)  
t1825  
Human influence was very likely the main driver of these increases since at least 1971 (Figure 3.4). Human influence is very likely the main driver of the global retreat of glaciers since the 1990s and the decrease in Arctic sea ice area between 1979–1988 and 2010–2019. Human influence has also very likely contributed to decreased Northern Hemisphere spring snow cover and surface melting of the Greenland ice sheet. It is virtually certain that human-caused CO<sub>2</sub> emissions are the main driver of current global acidification of the surface open ocean.  
Q 2.1.2.a

<https://kg-ipclimatec-reports.wikibase.cloud/wiki/Item:Q106>



# UNFCCC Documents (COP)

## Datatables (An index for UNFCCC reports)



### Reports in semantic HTML

Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its first session, held in Marrakech from 15 to 18 November 2016
Addendum
Part two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
Contents
Decisions adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
Decision Page
1/CMA.1 Matters relating to the implementation of the Paris Agreement .....
2/CMA.1 Rules of procedure of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement .....
Resolution
1/CMA.1 Expression of gratitude to the Government of the Kingdom of Morocco
United Nations FCCC PA/CMA/2016/3/Add.1
Distr.: General 31 January 2017
Original: English
2
Decision 1/CMA.1
Matters relating to the implementation of the Paris Agreement

file	title	pdf
<a href="#">CMA_1/html/13_20_CMA_1/total_pages.html</a>	Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on the third part of its first session, held in Katowice from 2 to 15 December 2018	<a href="#">13_20_CMA_1</a>
<a href="#">CMA_1/html/1_CMA_1/total_pages.html</a>	Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on the first part of its first session, held in Marrakech from 15 to 18 November 2016	<a href="#">1_CMA_1</a>
<a href="#">CMA_1/html/2_CMA_1/total_pages.html</a>	Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on the first part of its first session, held in Marrakech from 15 to 18 November 2016	<a href="#">2_CMA_1</a>
<a href="#">CMA_1/html/3_12_CMA_1/total_pages.html</a>	Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on the third part of its first session, held in Katowice from 2 to 15 December 2018	<a href="#">3_12_CMA_1</a>
<a href="#">CMA_2/html/1_9_CMA_2/total_pages.html</a>	Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its second session, held in Madrid from 2 to 15 December 2019	
<a href="#">CMA_3/html/1_4_CMA_3/total_pages.html</a>	Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its third session, held in Glasgow from 31 October to 13 November 2021	
<a href="#">CMA_3/html/5_CMA_3/total_pages.html</a>	?	
<a href="#">CMA_3/html/6_24_CMA_3/total_pages.html</a>	Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its third session, held in Glasgow from 31 October to 13 November 2021	
<a href="#">CMA_4/html/12_24_CMA_4/total_pages.html</a>	Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its fourth session, held in Sharm el-Sheikh from 6 to 18 November 2022	
<a href="#">CMA_4/html/1_5_CMA_4/total_pages.html</a>	Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its fourth session, held in Sharm el-Sheikh from 6 to 18 November 2022	

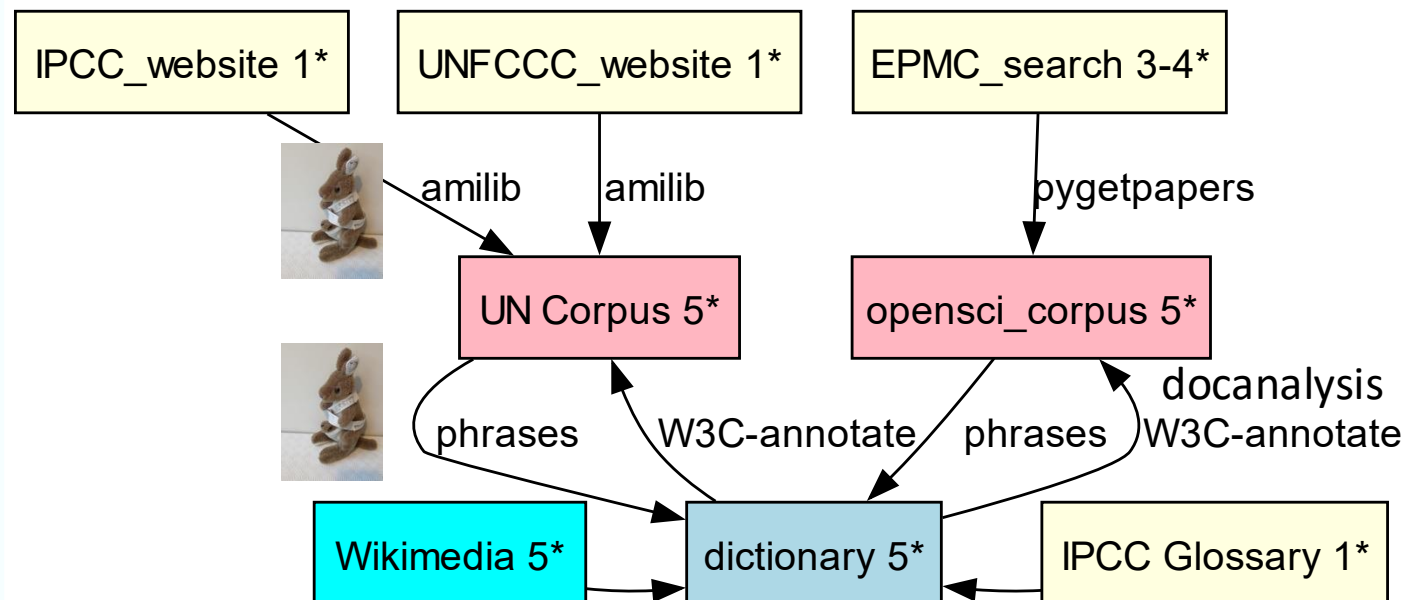
Showing 1 to 10 of 77 entries

### COP Reports in PDF

	United Nations
	Framework Convention on Climate Change
Conference of the Parties serving as the meeting of the Parties to the Paris Agreement	
Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on the first part of its first session, held in Marrakech from 15 to 18 November 2016	
Addendum	
Part two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement	
Contents	
Decisions adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement	
Decision	Page
1/CMA.1 Matters relating to the implementation of the Paris Agreement .....	2
2/CMA.1 Rules of procedure of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement .....	4

#semanticClimate builds Free and Open-source Software to create Linked Open Documents (5-star)

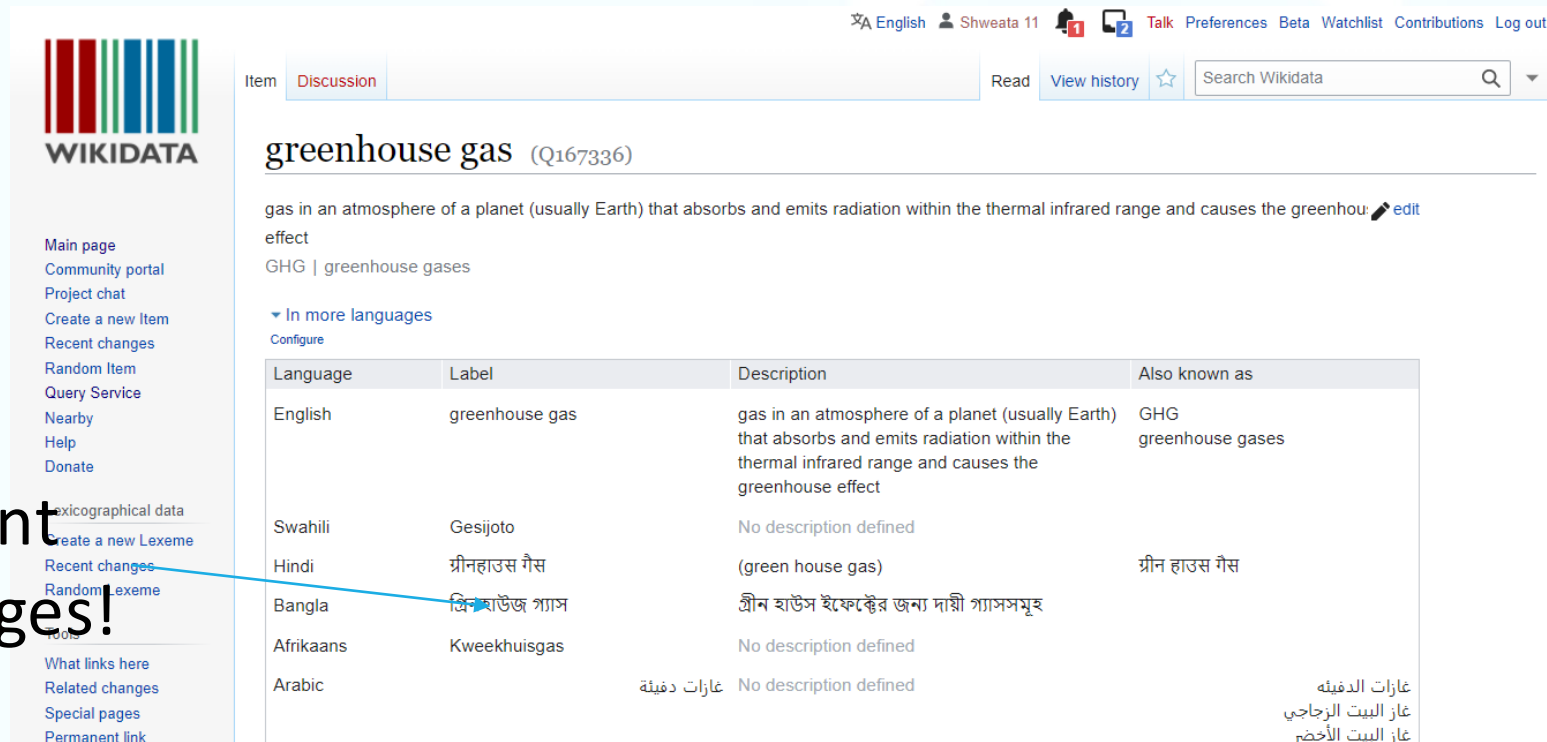
## 5\*-ification of climate documents



# Dictionary

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<entry name="VRE" term="Variable Renewable Energy" wikidataID="Q7915732"/>
<entry name="NDC" term="Nationally Determined Contributions" wikidataID="Q20051297"/>
<entry name="GHG" term="Greenhouse Gas" wikidataID="Q167336"/>
```

Different  
languages!



Wikidata

English Shweata 11 1 2 Talk Preferences Beta Watchlist Contributions Log out

Item Discussion Read View history Search Wikidata

## greenhouse gas (Q167336)

gas in an atmosphere of a planet (usually Earth) that absorbs and emits radiation within the thermal infrared range and causes the greenhouse effect [edit](#)

GHG | greenhouse gases

▼ In more languages

Configure

Language	Label	Description	Also known as
English	greenhouse gas	gas in an atmosphere of a planet (usually Earth) that absorbs and emits radiation within the thermal infrared range and causes the greenhouse effect	GHG greenhouse gases
Swahili	Gesijoto	No description defined	
Hindi	ग्रीनहाउस गैस	(green house gas)	ग्रीन हाउस गैस
Bangla	গ্রীন হাউস গ্যাস	গ্রীন হাউস ইফেক্টের জন্য দায়ী গ্যাসসমূহ	
Afrikaans	Kweekhuisgas	No description defined	
Arabic	غازات دفيئة	No description defined	غازات الدفيئة غاز البيت الزجاجي غاز البيت الأخضر

Lexicographical data

Create a new Lexeme

Recent changes

Random Lexeme

Tools

What links here

Related changes

Special pages

Permanent link



# How We Work



**Moobashara Jawed**

AR6/WG1/Chapter 2: Changing  
State of the Climate System



**Anudev S**

AR6/WG2/Chapter 6: Cities,  
settlements and key infrastructure



**Mebin Joseph**

AR6/WG2/Chapter 5: Food, Fibre  
and Other Ecosystem Product



**Shabnam Barbhuiya**

AR6/WG1/Chapter 10: Linking  
Global to Regional Climate Change



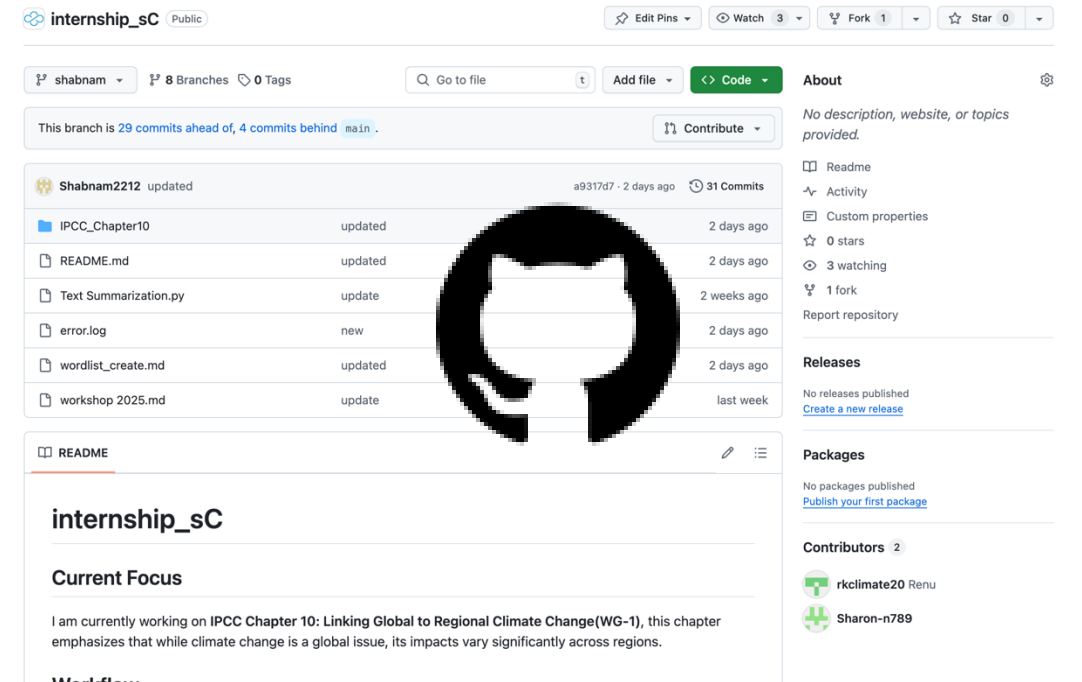
**Sharon Nayak**

AR6/WG2/Cross-Chapter Paper 7:  
Tropical Forests

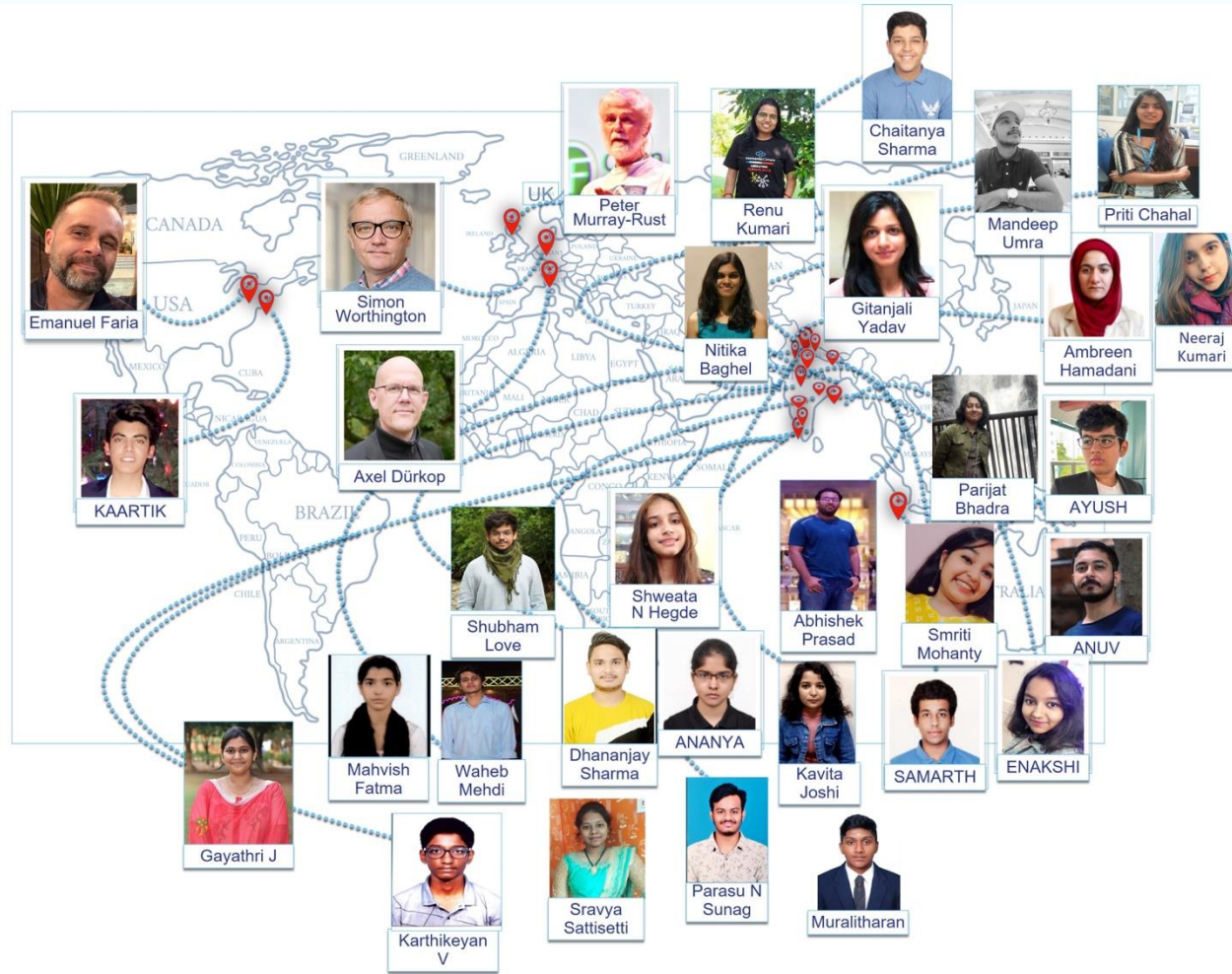


**Madhana Kumar**

AR6/WG2/Chapter 4 : Water



# Sustainable Tech is created by Community



- Youth Learning by Doing; Internship Programme hosted at the National Institute of Plant Genome Research (NIPGR)
- 100+ participants



# Community: Outreach

## Outreach Organised

Hackathon at NII, New Delhi



Datathon at Gujarat, India



Outreach and Alumni meet



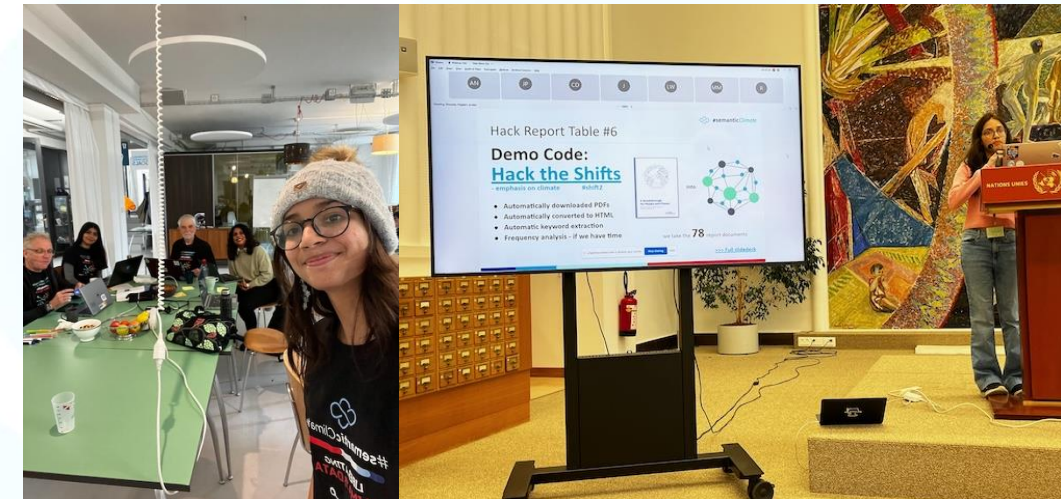
Workshop at New Delhi



Workshop at NIPGR, New Delhi



## Outreach participated in



UNDatathon, UN Library Hackathon

# Hands-on workshop on BioAI for Research



~30  
participants



Thirteen  
speakers shared  
valuable insights  
with the  
delegates.



Computer  
Vision for  
semantifying  
images



RAG for  
summarizing  
IPCC paragraphs



# Useful Links

## Tools

[amilib](#)

[pygetpapers](#)

## Products

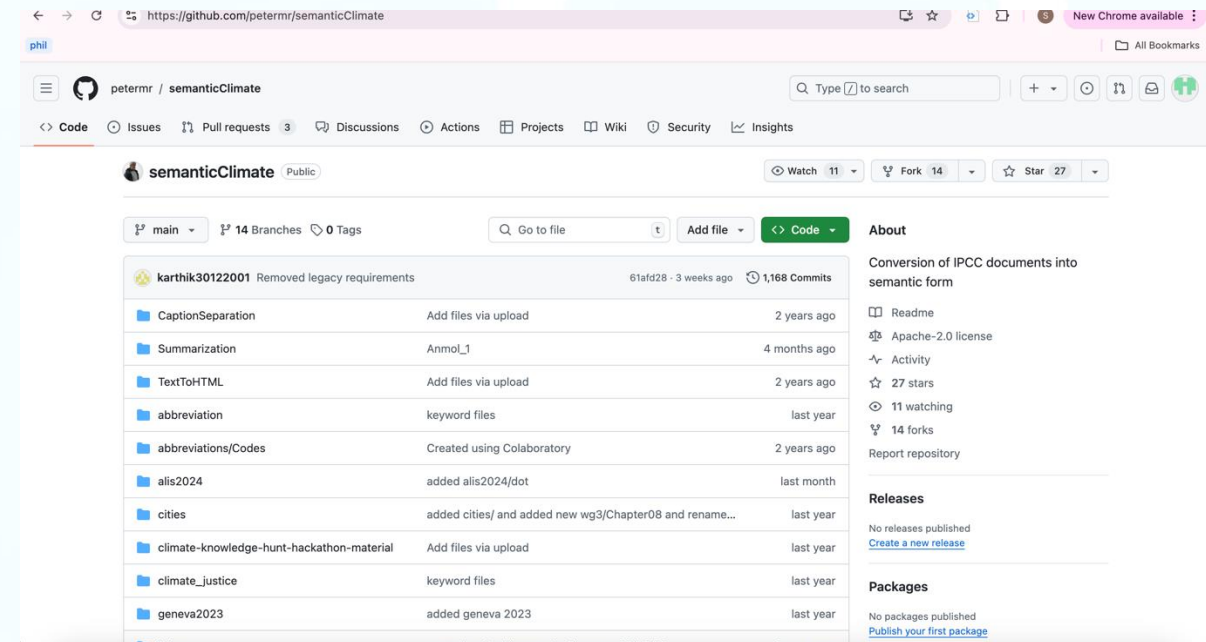
[IPCC Glossary](#)

[Wikibase Instance](#)

[Semantic IPCC corpus HTML Outputs](#)

## Outreach

[Event highlights](#)







Outreach and Alumni meet



Workshop at New Delhi



Let's make climate knowledge 5-star (semantic)!

