



Dacian: extinct language spoken in the ancient region of Dacia; extinct 4th c. AD due to Roman colonisation.

← Ptolemy's Geography

Doina Bucur

read: [**Doy**-nah **Boo**-kooor]

**Network Data Science /
Complex systems**

UTwente 



<https://doina.net>



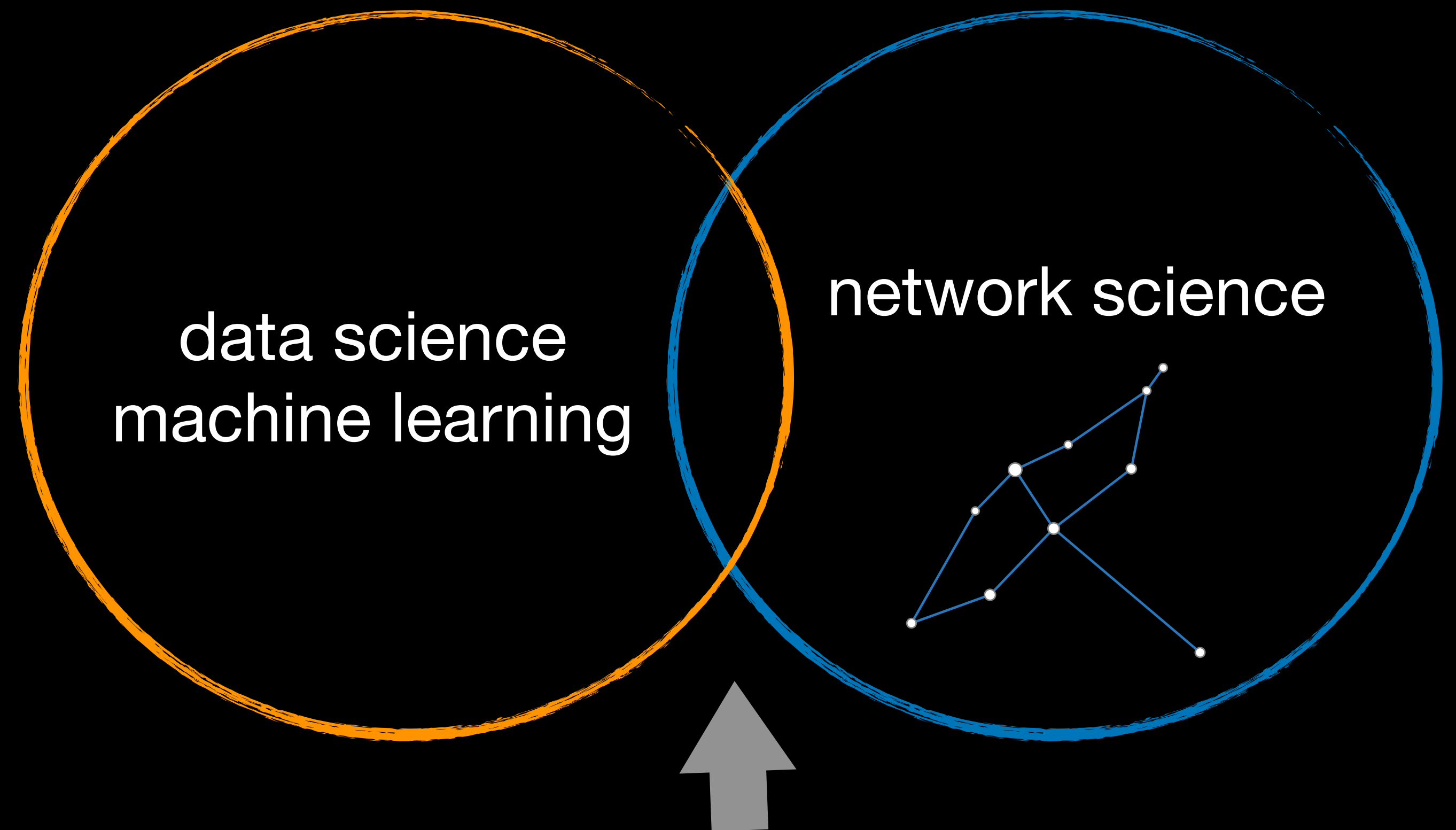
d.bucur@utwente.nl



@doina_net

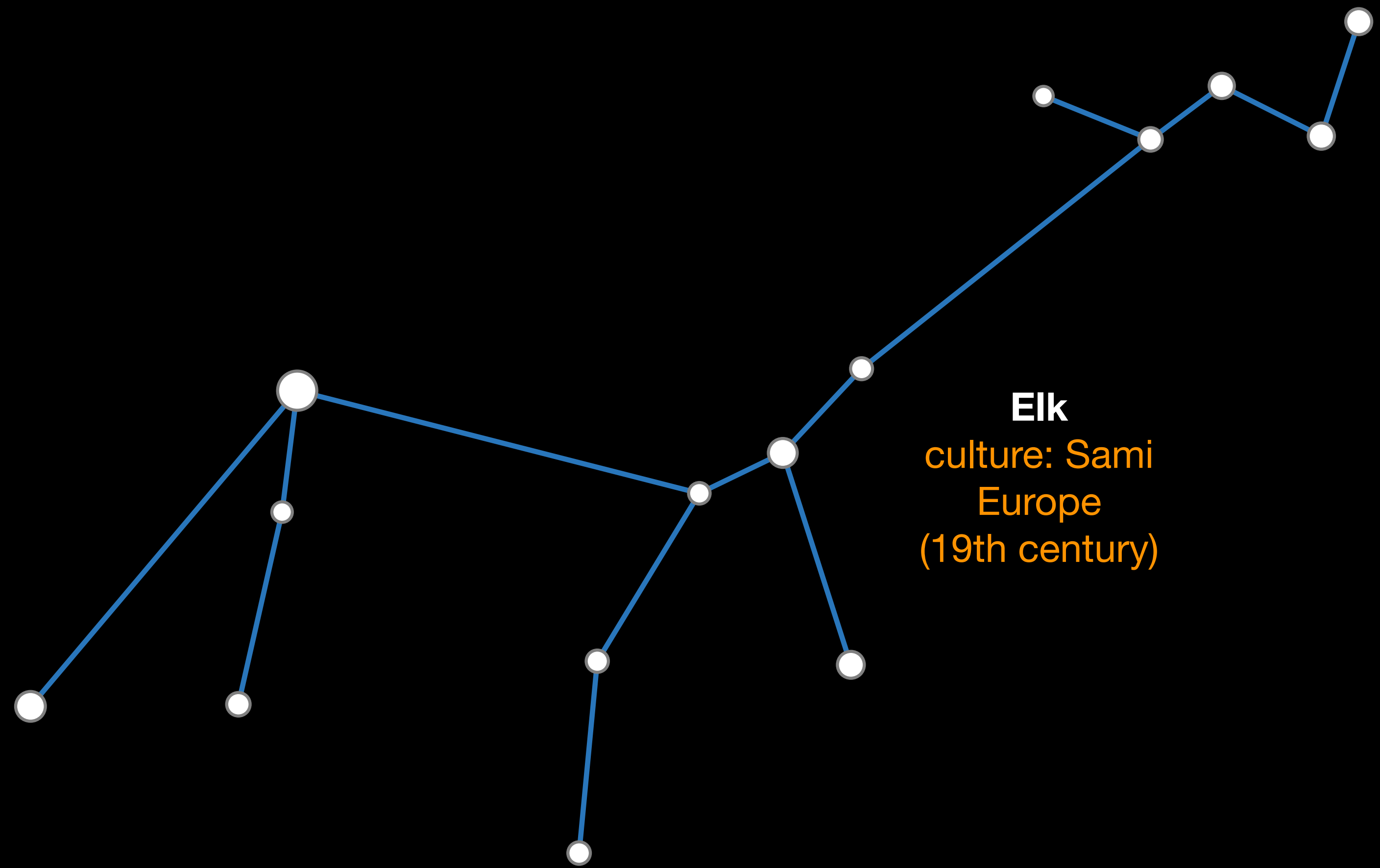


@doina@fediscience.org



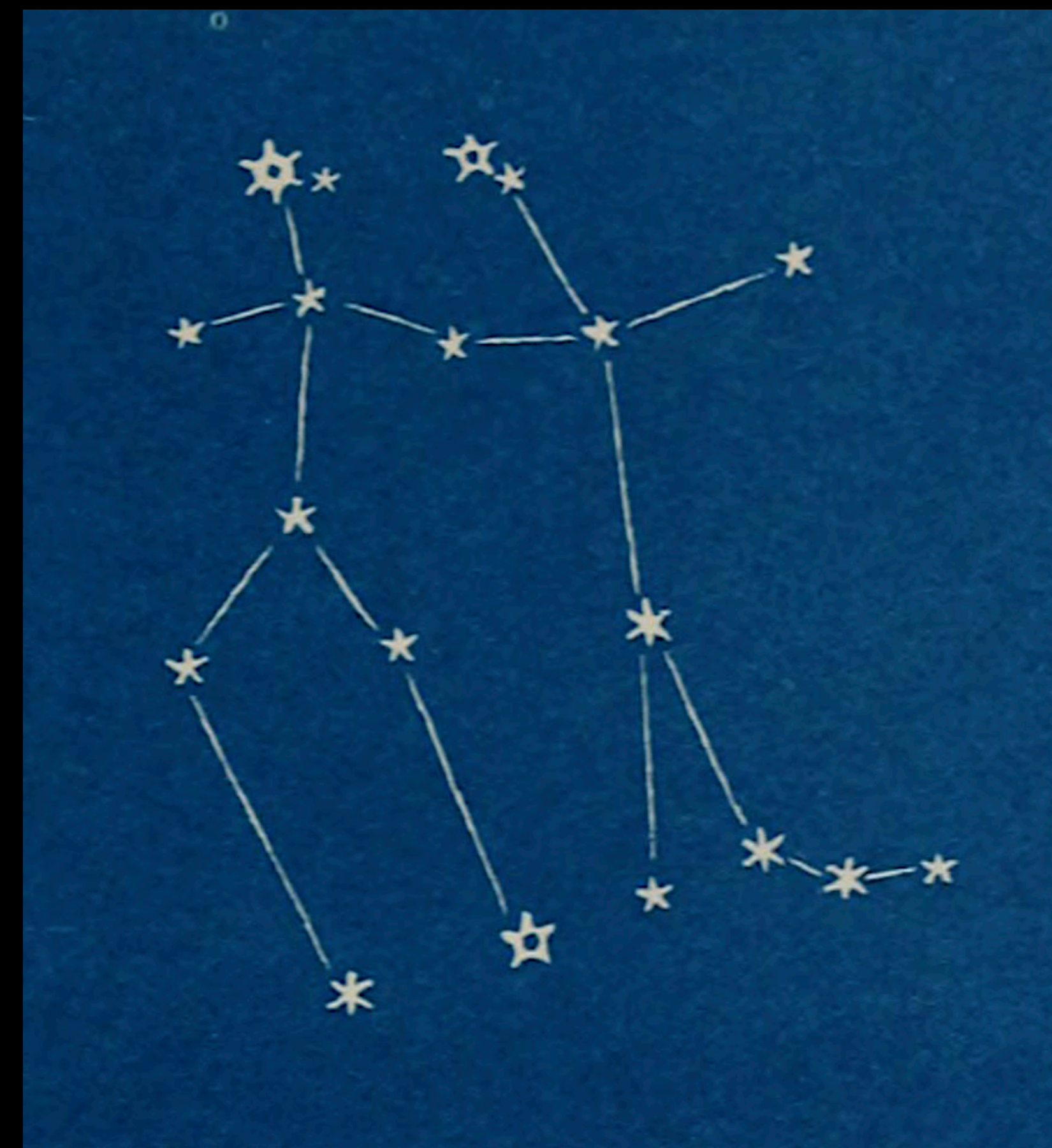
very many applications in other disciplines:
social sciences, cognition, neuroscience, ecology

Constellation **line figures**: forming and analysing a **scholarly cross-culture** dataset



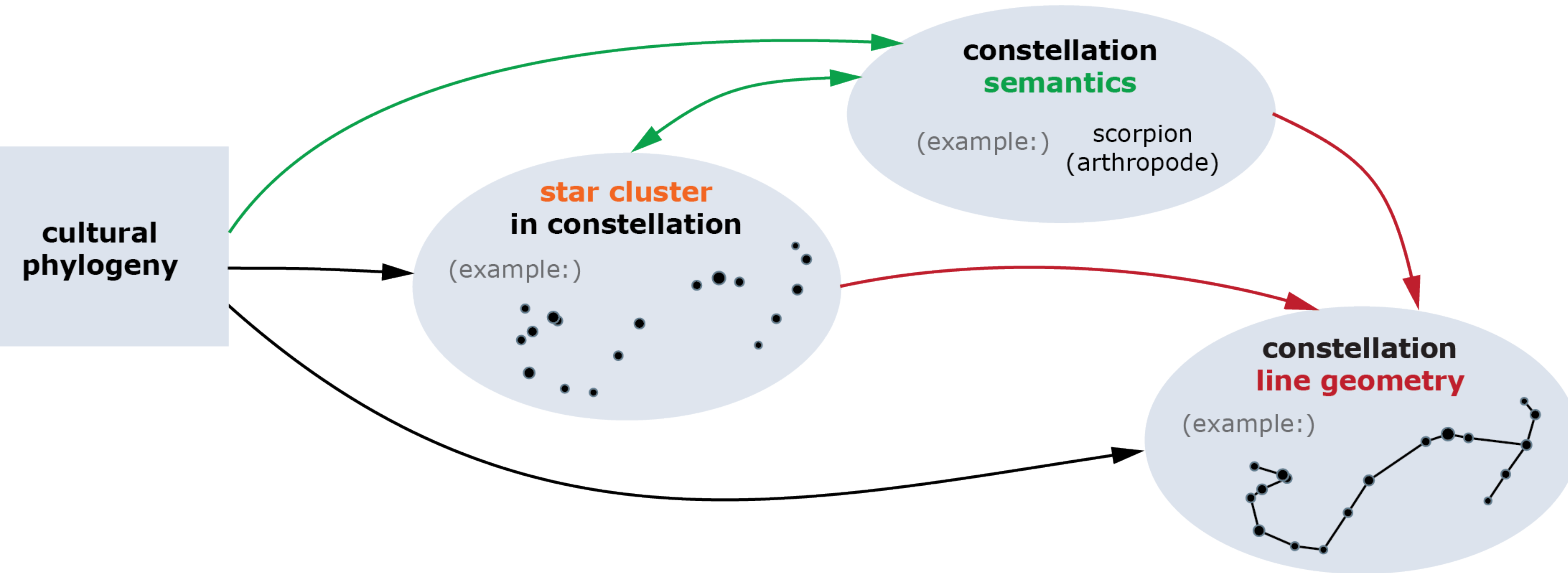


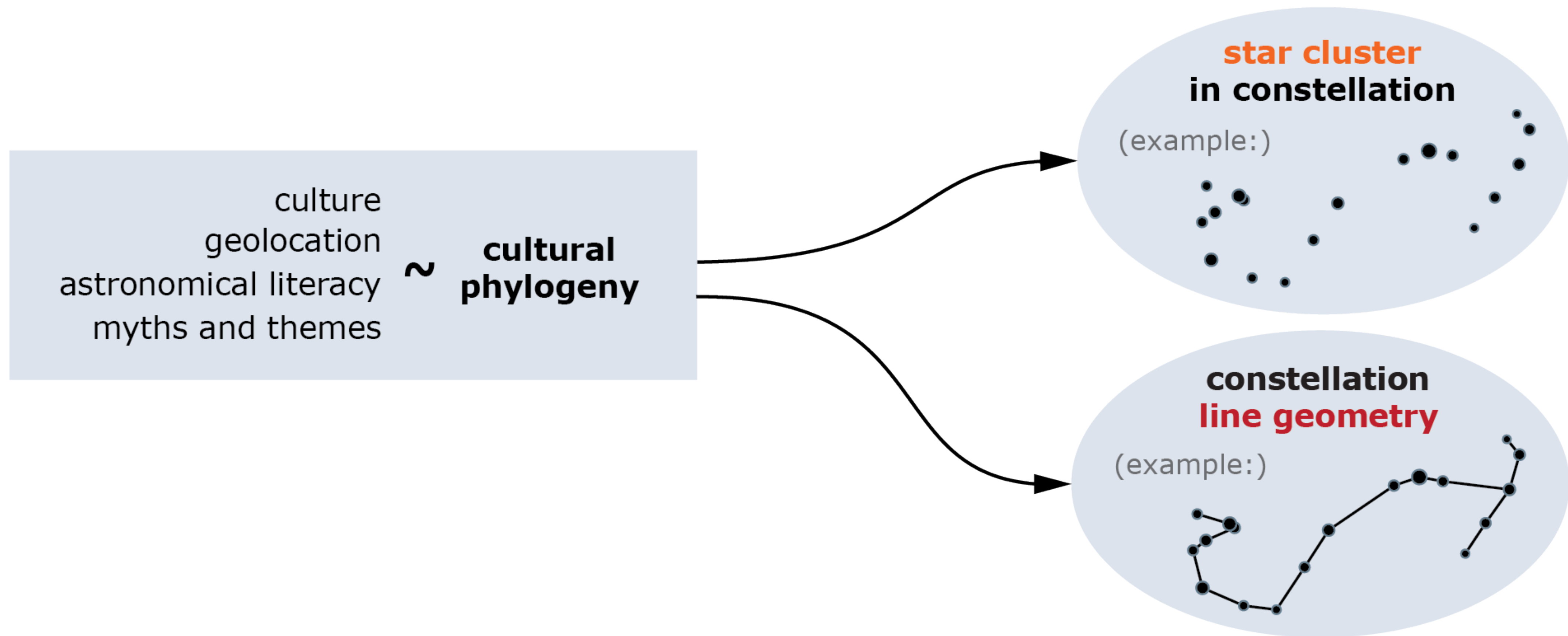




geometry (figurative or abstract)

types of data and metadata

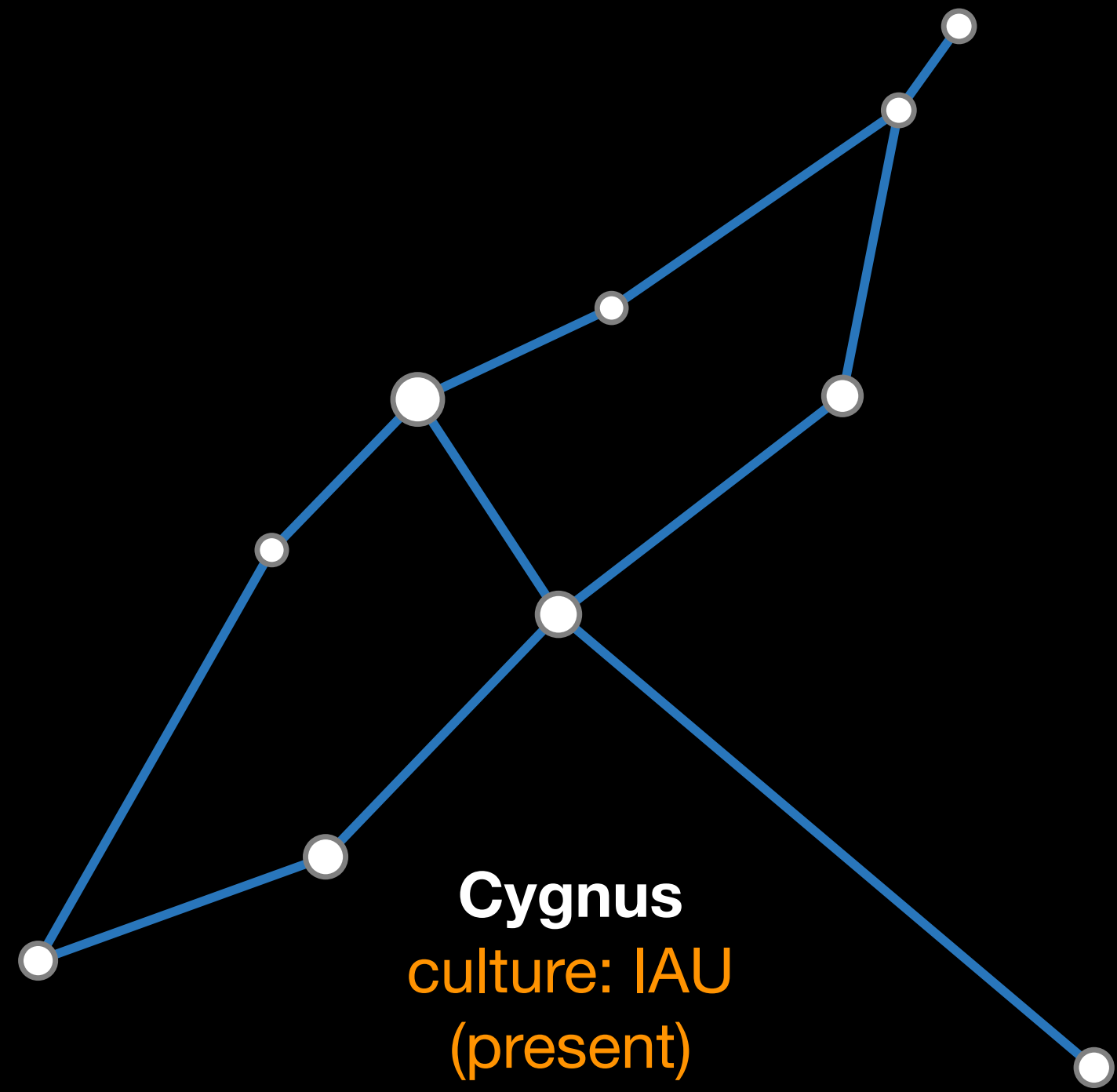


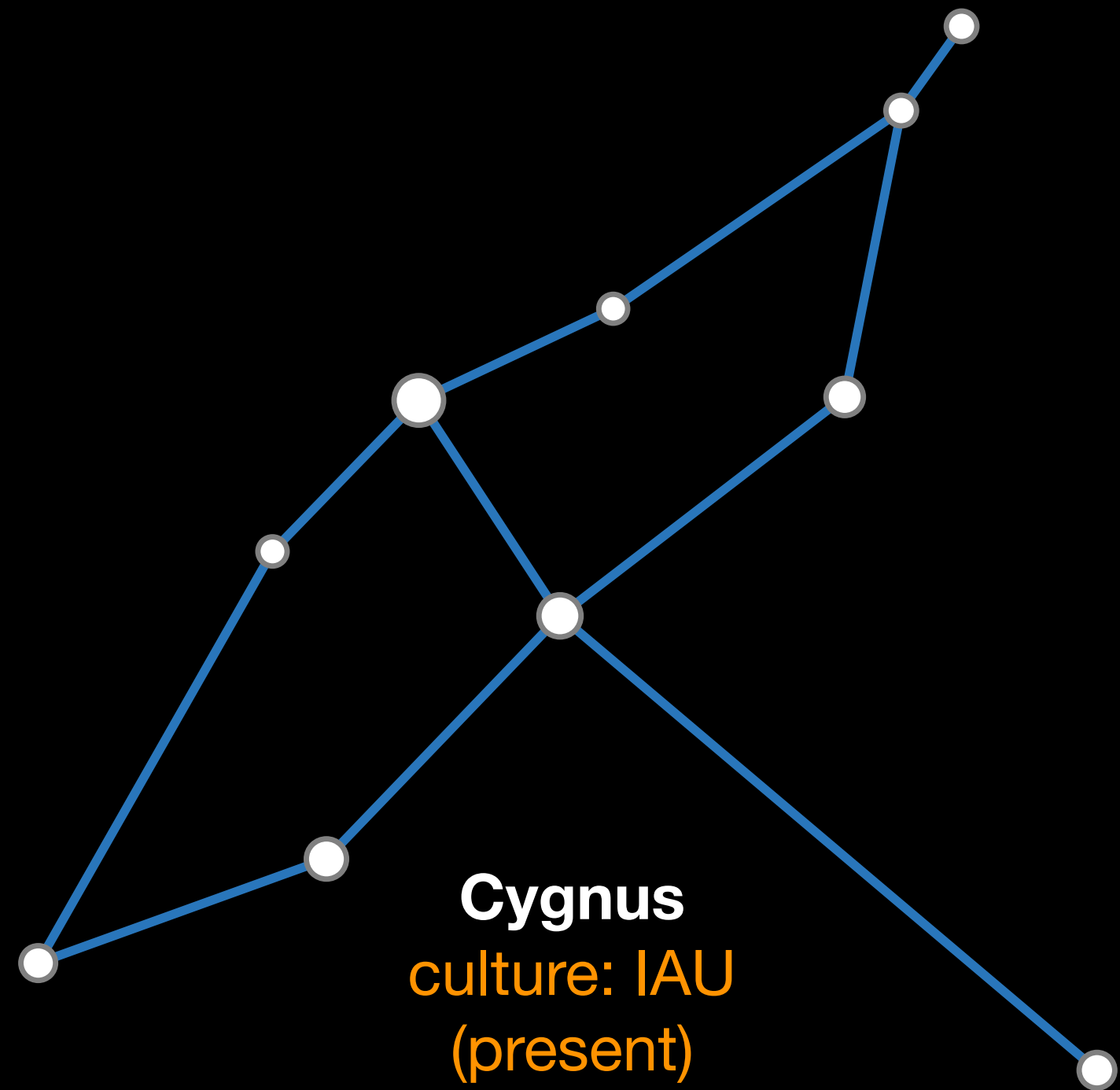


Do cultures / regions have a **constellation style**?

Which cultures are **similar** in this respect (and why)?

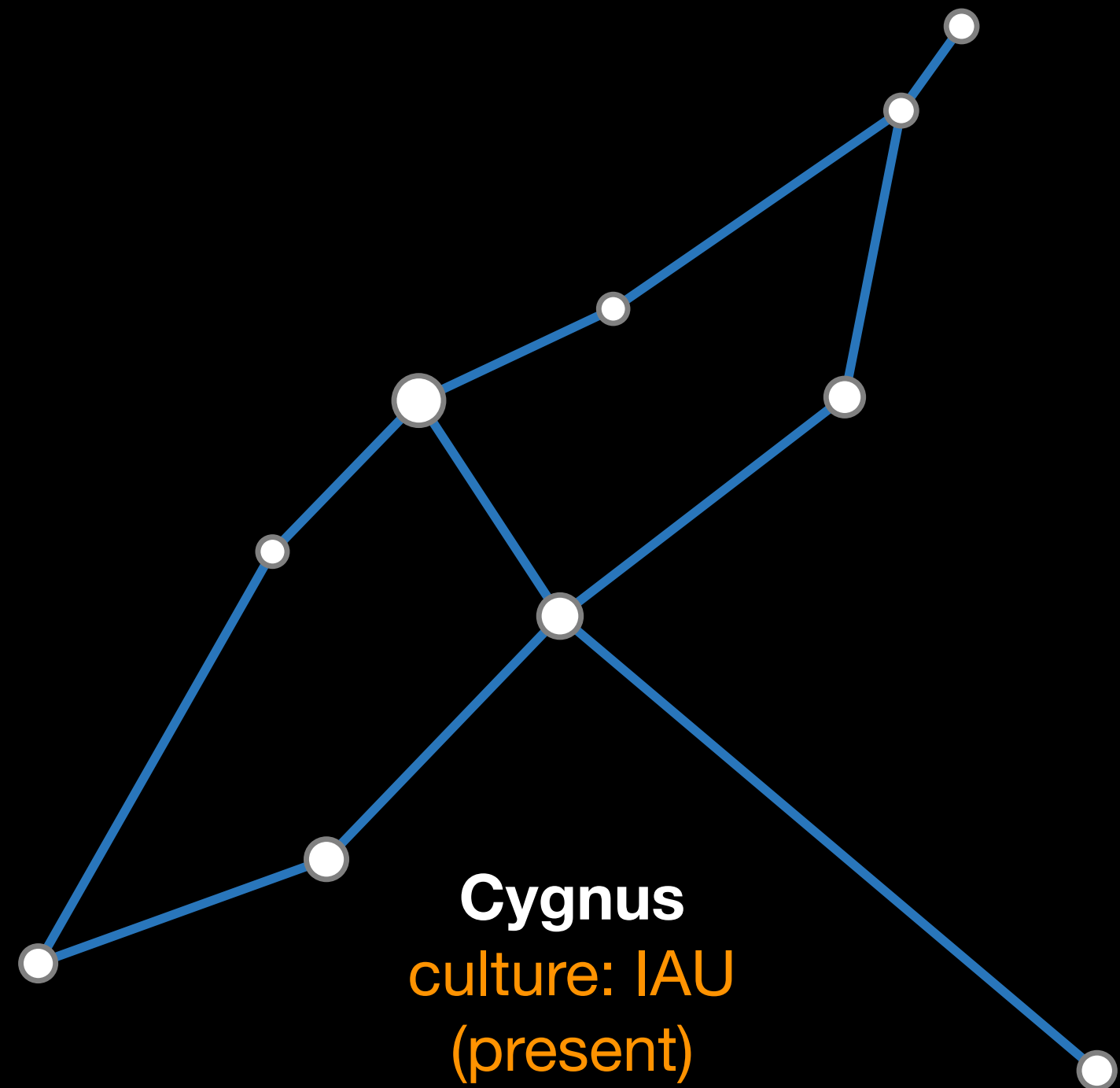
Is a style **universal**?





Geometry

# links	11
max. degree	4
avg. degree	2.20
max. core number	2
# cycles	2
# links in largest cycle	5
link diameter	5
link connectivity	1

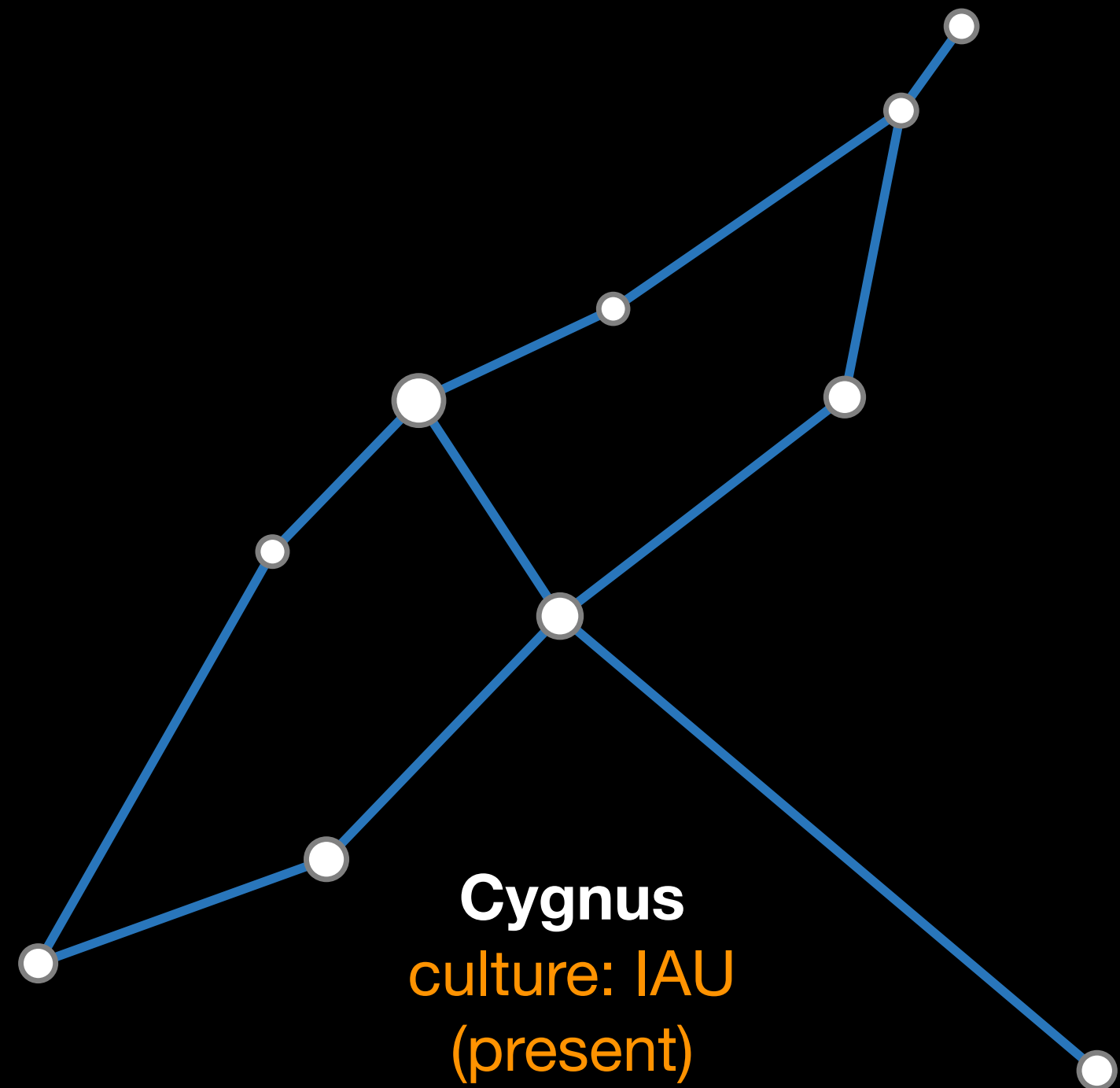


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Spatial statistics

spatial diameter	31.23 deg.
avg. link length	7.72 deg.
sharpest angle	39.59 deg.
planar?	yes



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Spatial statistics

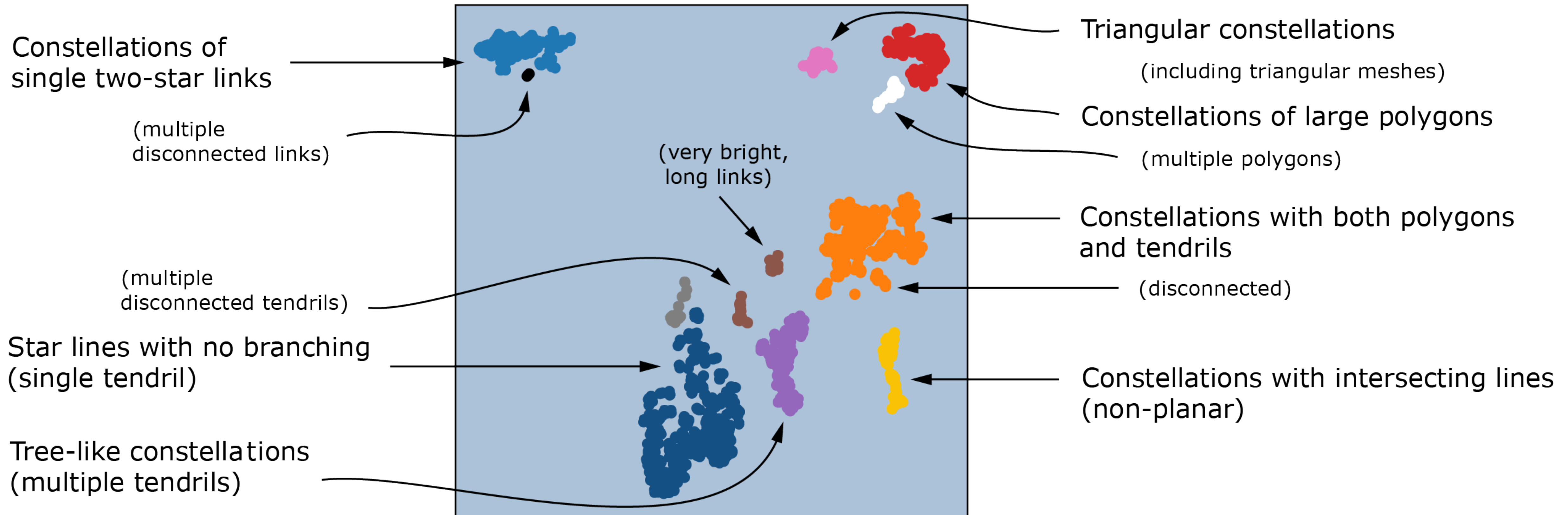
spatial diameter	31.23 deg.
avg. link length	7.72 deg.
sharpest angle	39.59 deg.
planar?	yes

Brightness

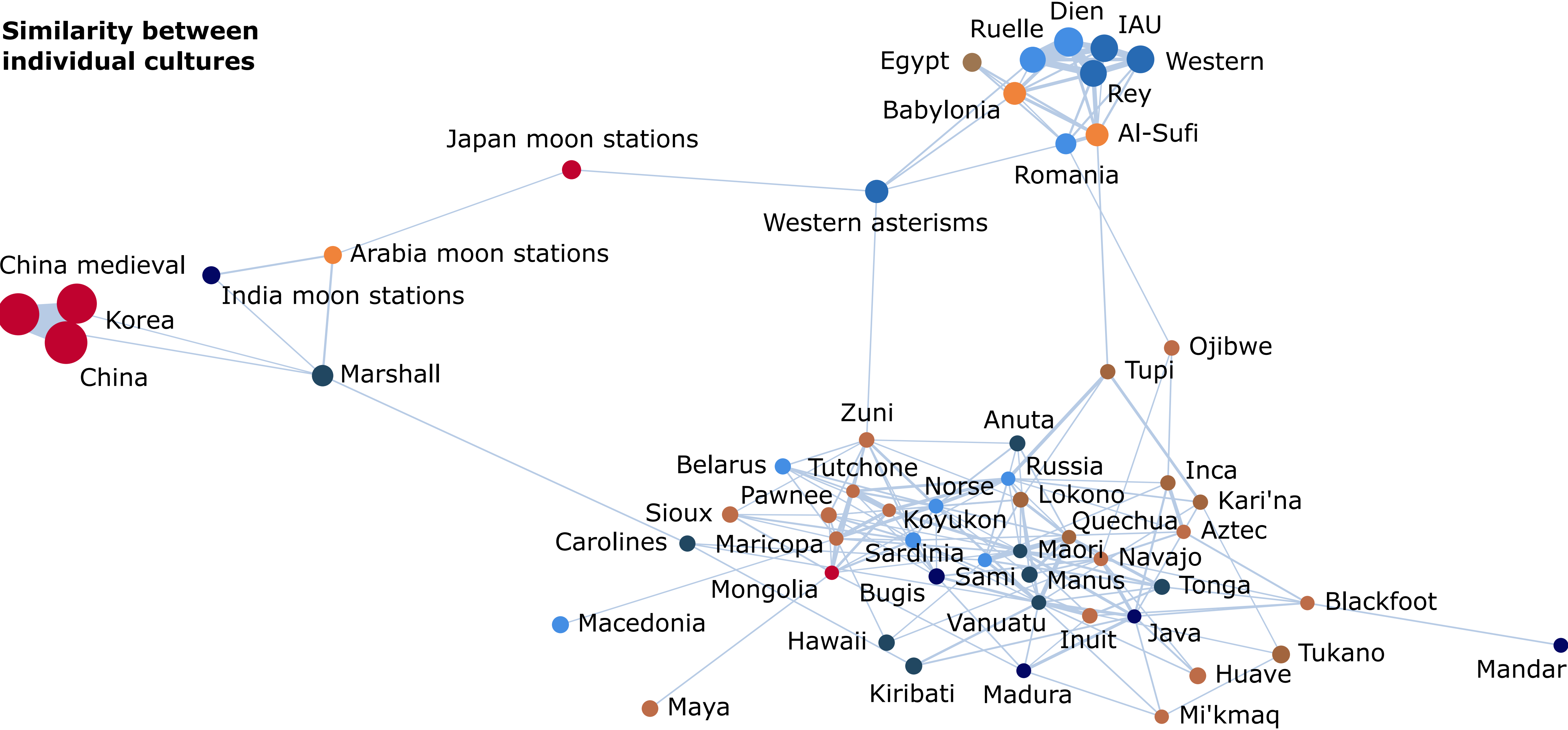
avg. magn.	3.05
min. magn.	1.25
max. magn.	3.98

...and some others

A “map” of all constellations

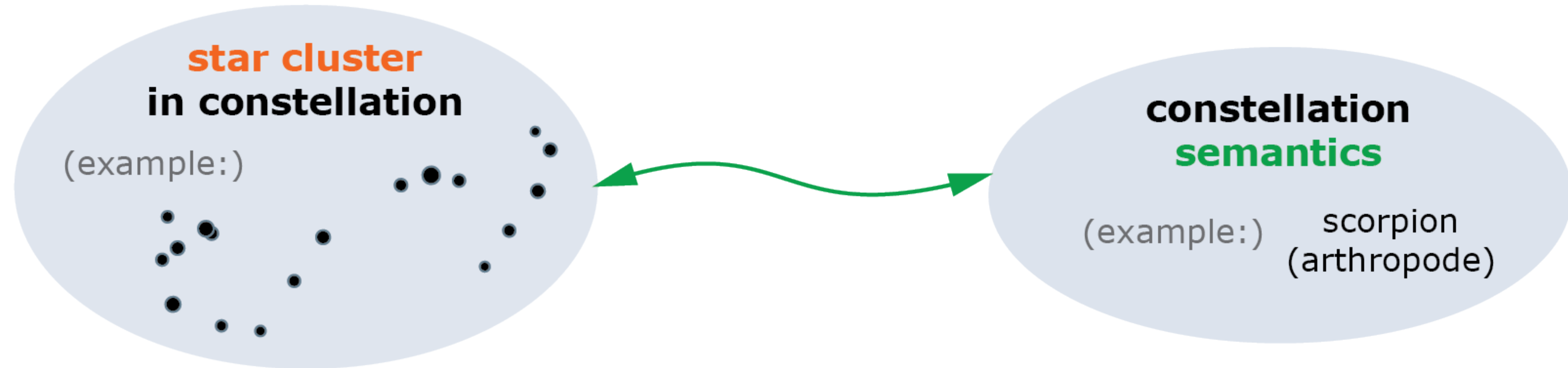


Similarity between individual cultures



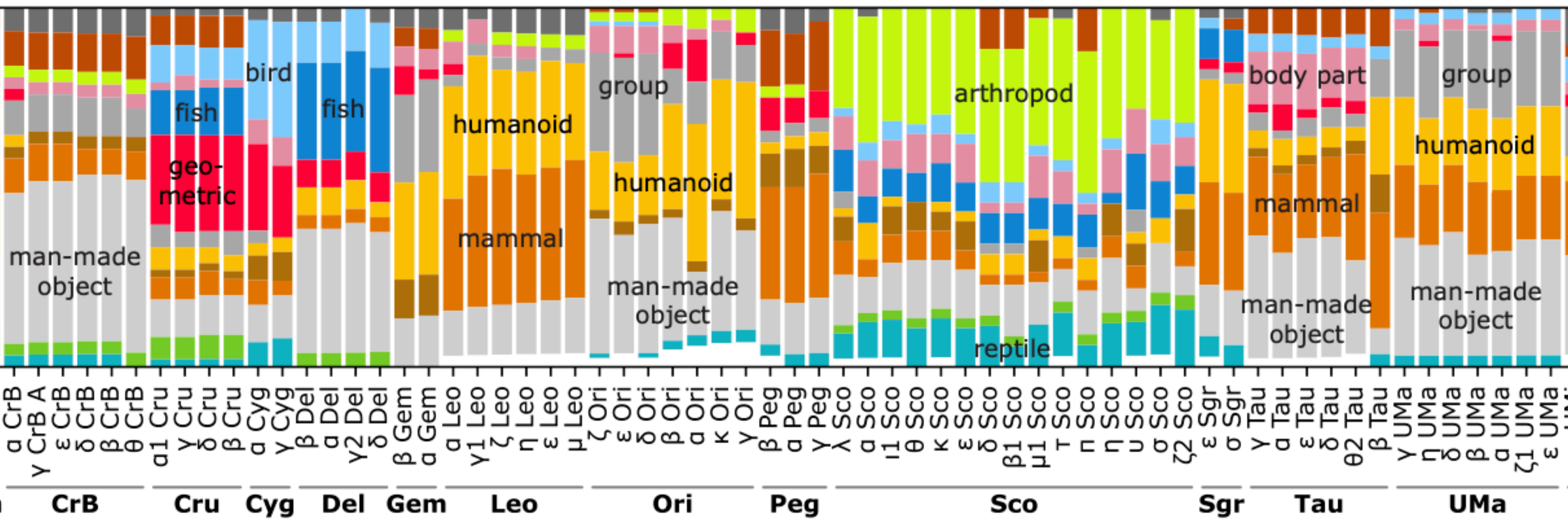
Bucur. *The network signature of constellation line figures* (PLOS ONE, 2022)

I need semantic annotations!



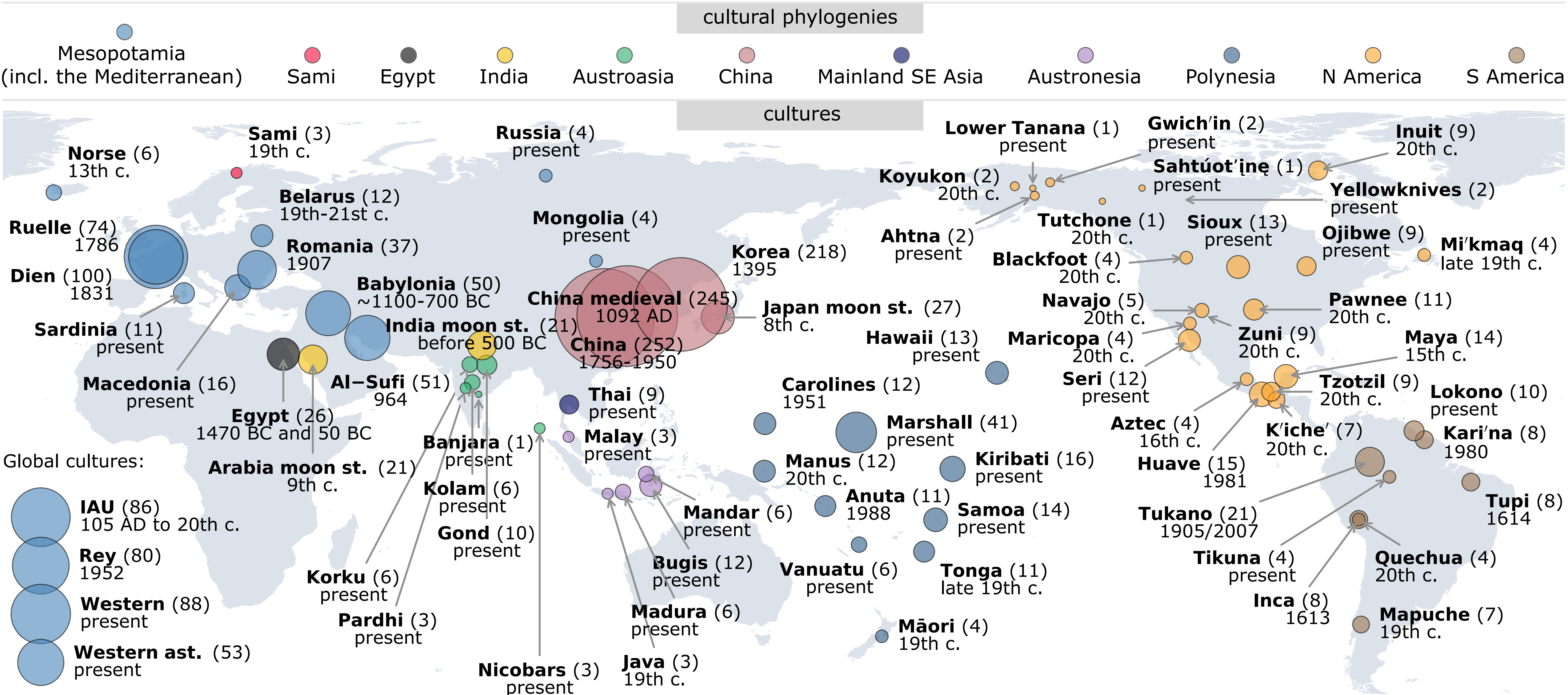
Do cultures imagine the **same** symbolism to the same (shape of) star cluster?

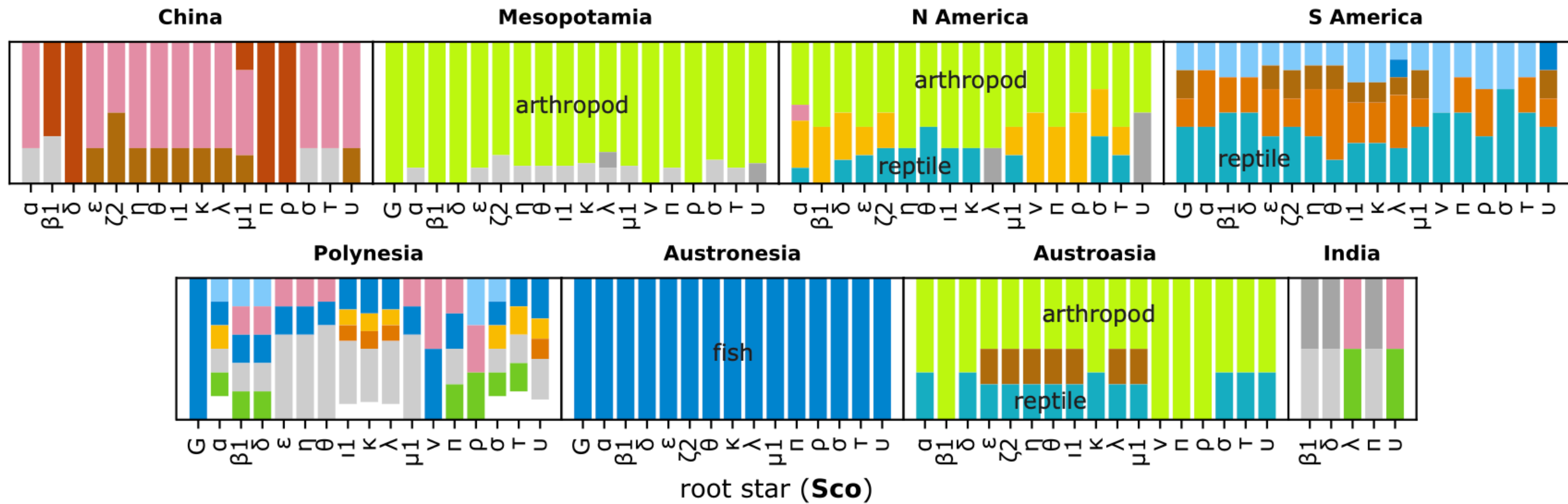
Is a semantic **universal**? What may have caused that?

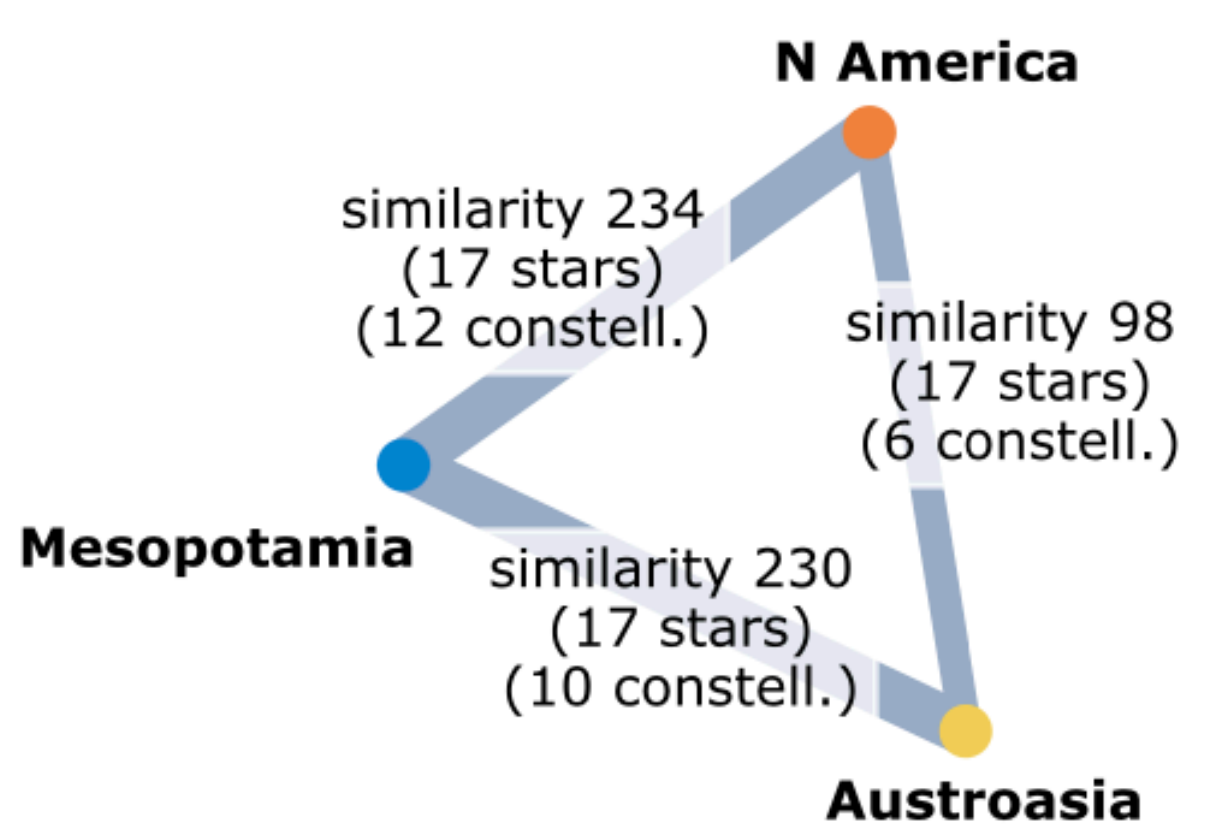
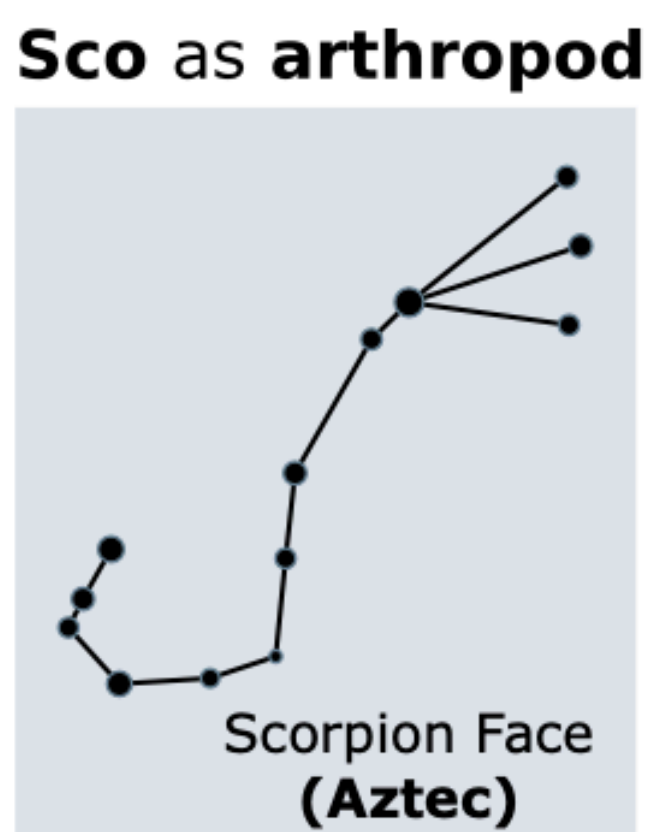
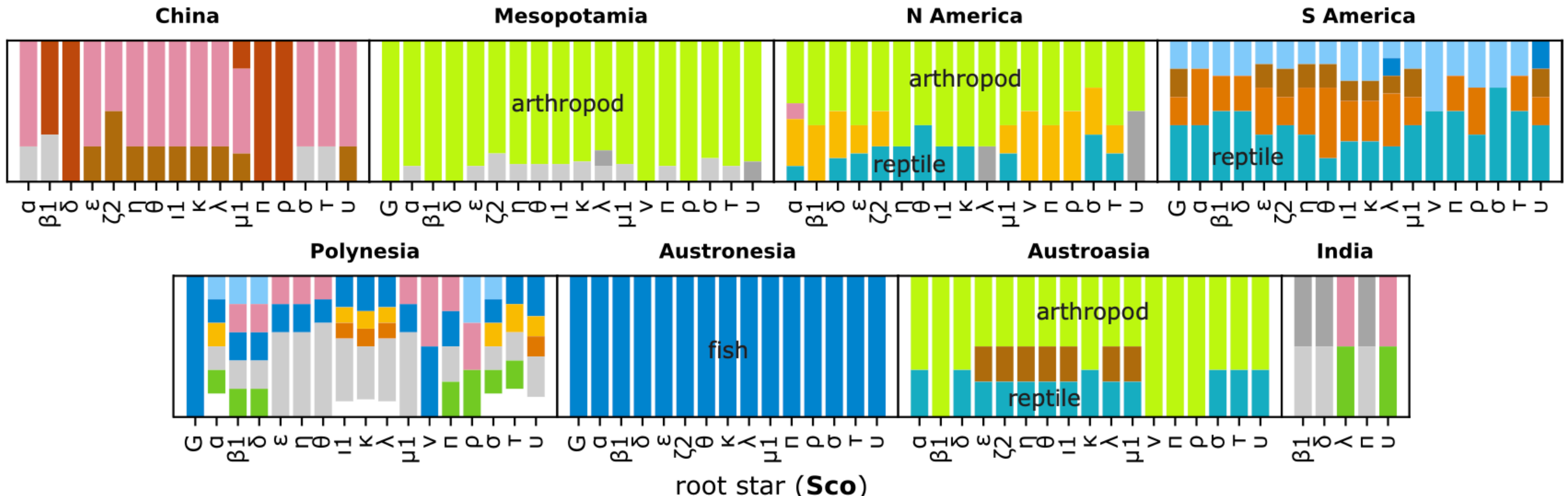


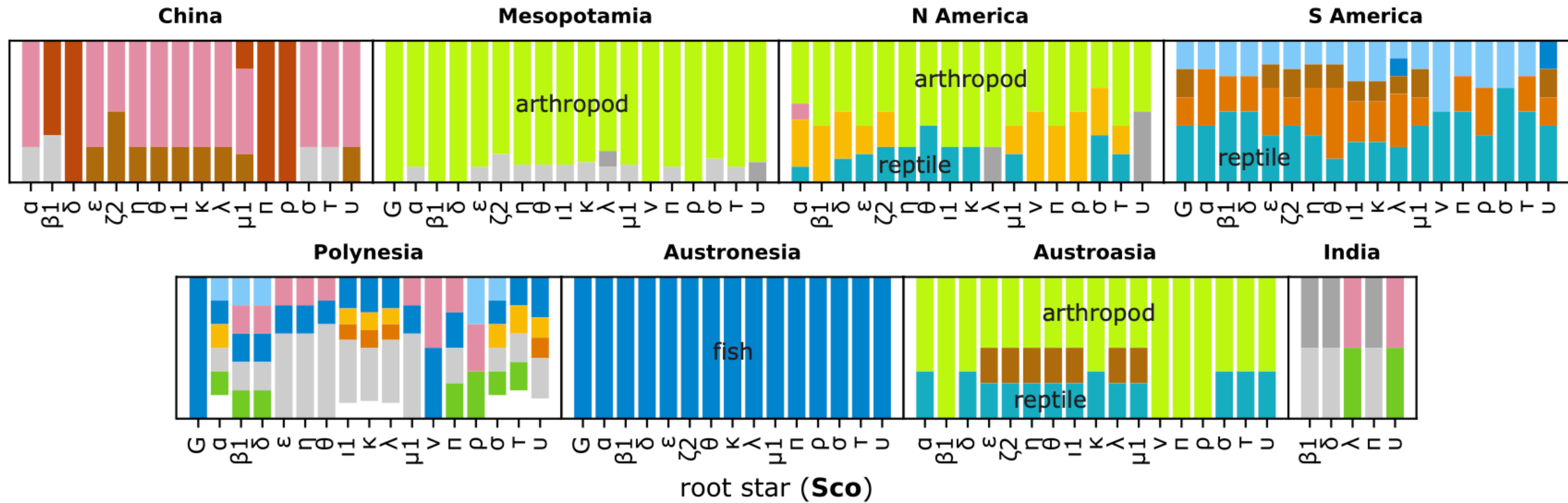
Bucur. *The semantics of constellation line figures* (arXiv:2306.17573, 2023)

dataset

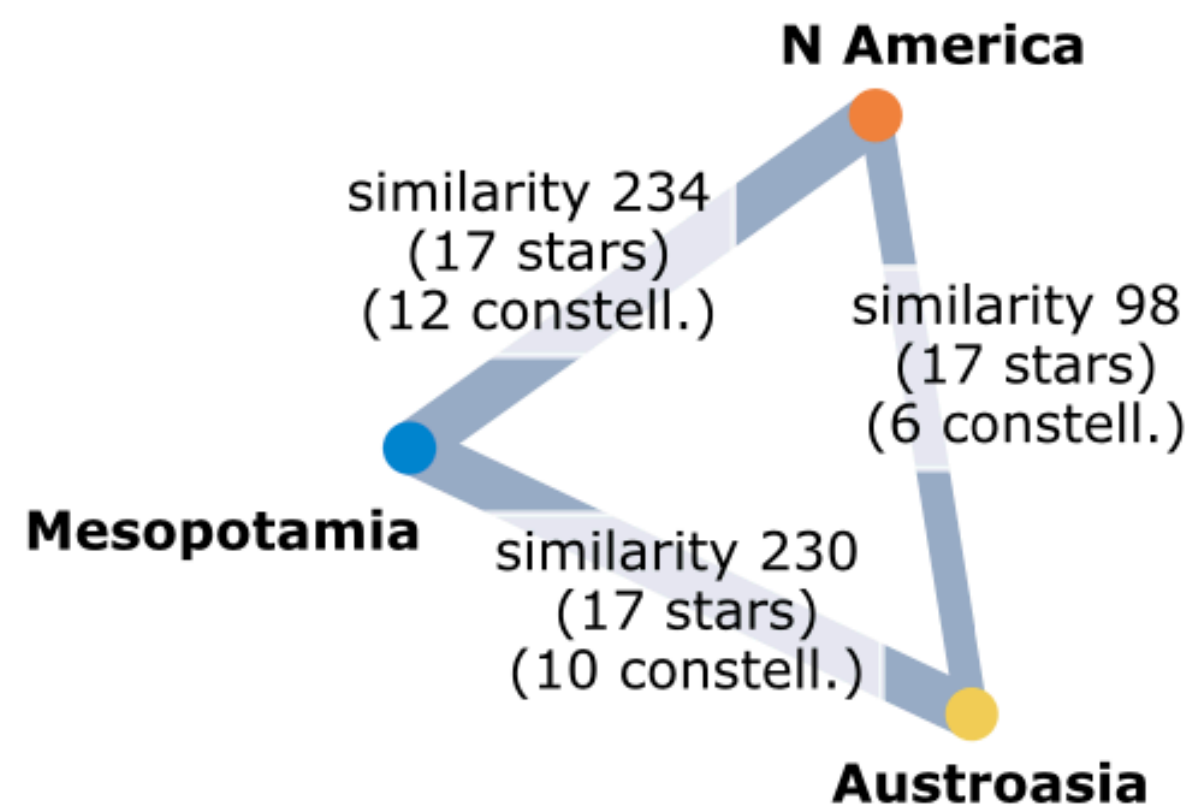
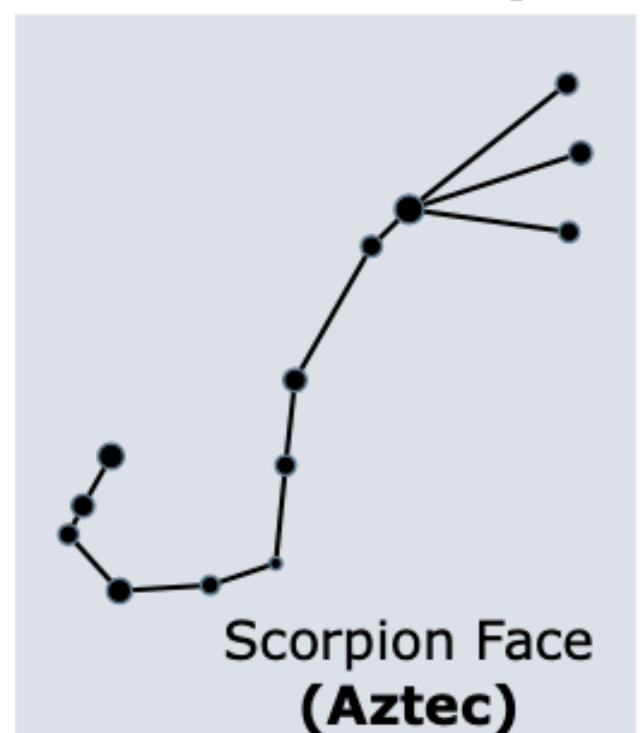




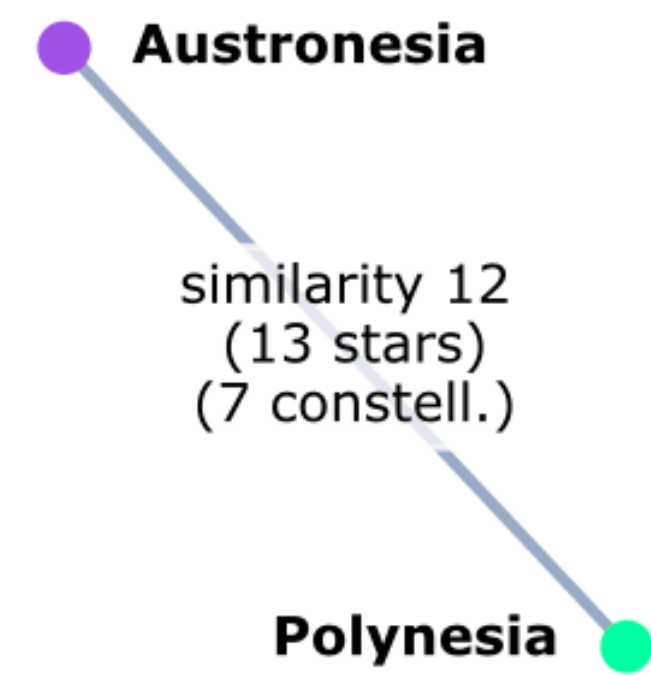
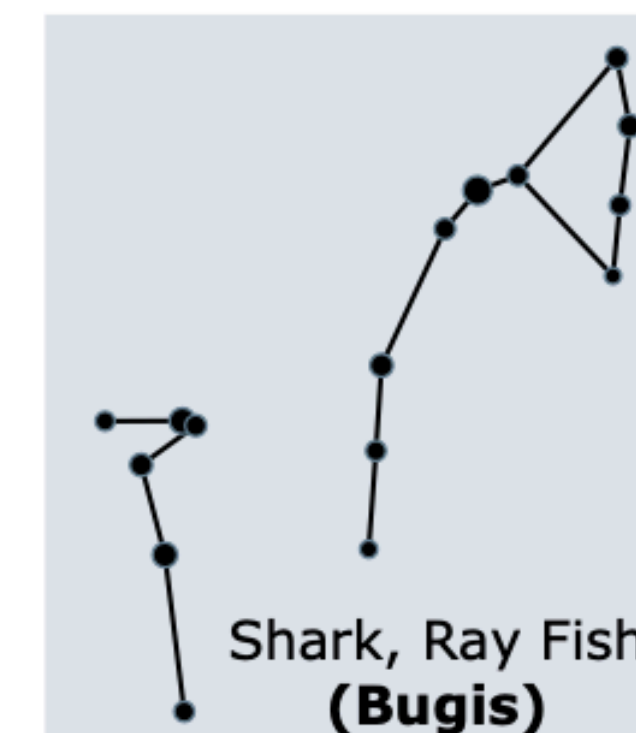




Sco as arthropod



Sco as fish



original aim: academic-grade dataset

75 astronomical cultures:

~half: the more **scholarly** in Stellarium
(validated against sources)

~half newly digitised from **sources:**

- papers
- books
- sky charts

1903 line figures:

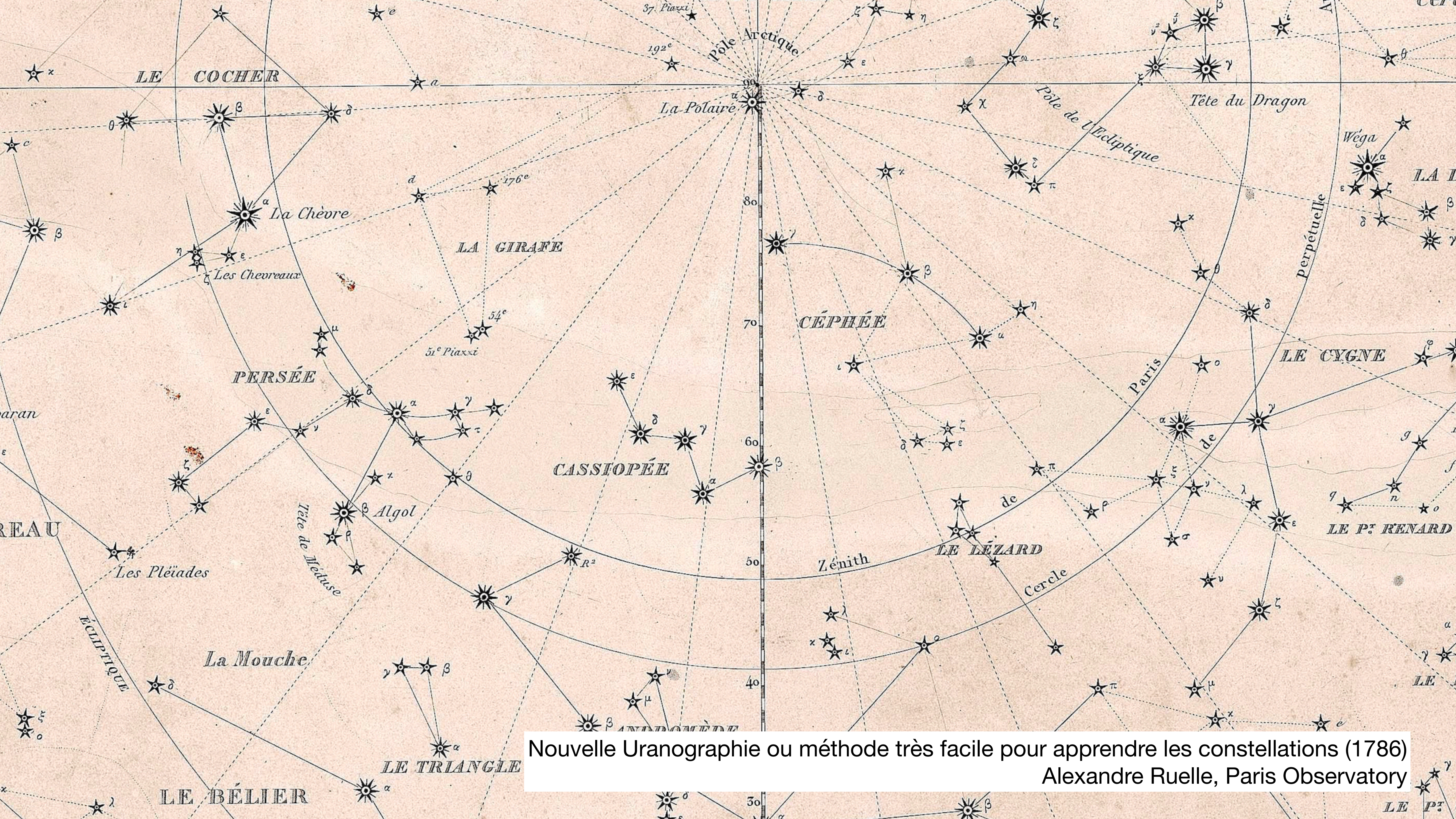
with 1+ lines

stars / lines must be drawn, described, or inferable with some **certainty** from source

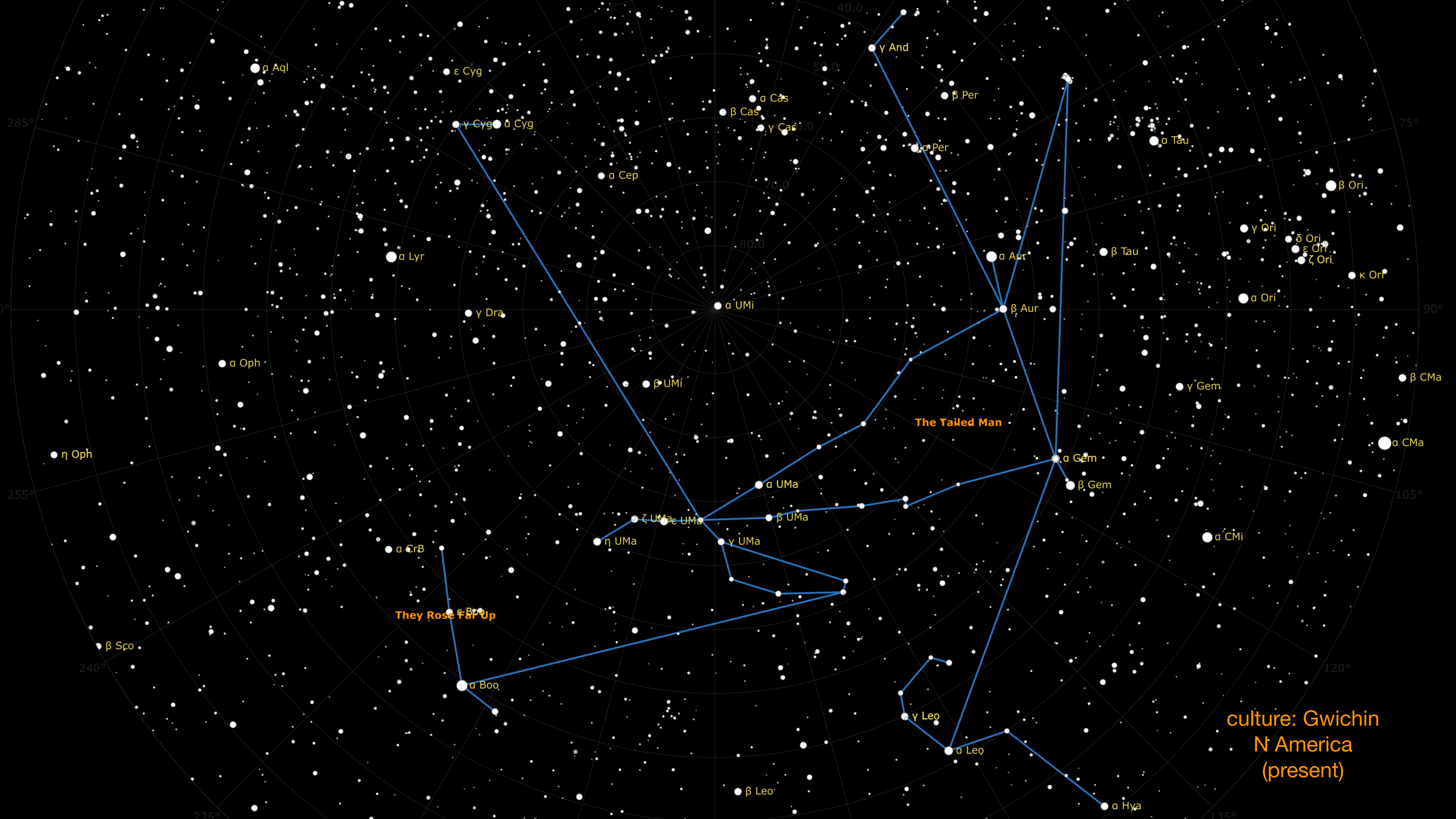
...contributed to Stellarium (slowly)

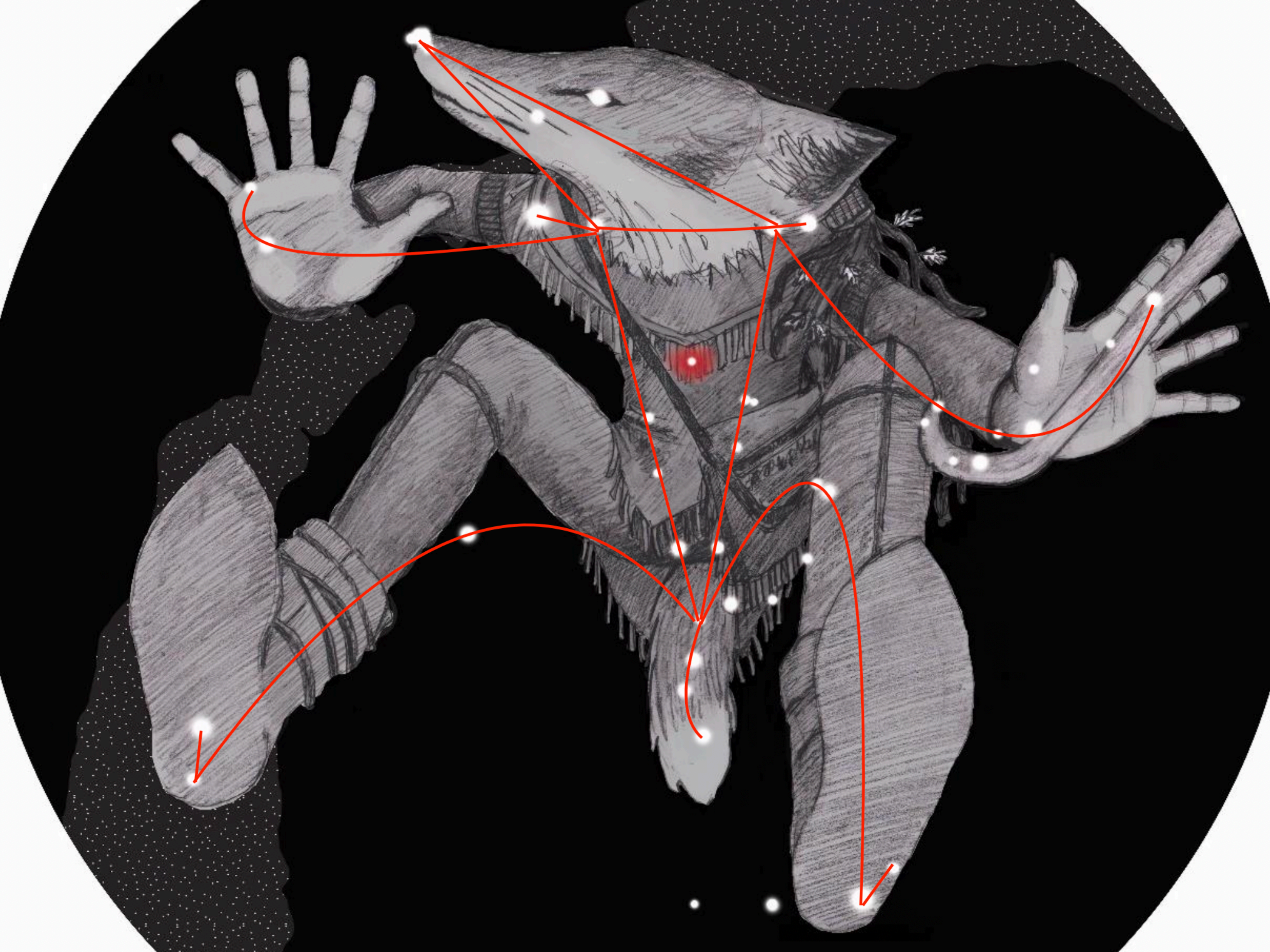
<https://github.com/doinab/constellation-lines>

location	phylogeny	sky culture	timestamp	source	#constellations	references
Global	M	IAU	105 AD–20th c.	standard	86	[38, 88]
Global	M	Rey	1952	book	80	[68, 88]
Global	M	Western	present	dataset	88	[88]
Global	M	Western asterisms	present	dataset	53	[88]
N Africa	E	Egypt	1470, 50 BC	carving, paper	26	[49, 88]
W Asia	M	Babylonia	1100-700 BC	tablet, papers	50	[35, 34, 36, 88]
W Asia	M	Al-Sufi	964 AD	book, dataset	51	[4, 88]
W Asia	In	Arabia moon st.	9th c.	book, paper	21	[45, 88]
S Asia	Aa	Banjara	present	paper	1	[82]
S Asia	Aa	Gond	present	paper	10	[81]
S Asia	Aa	Kolam	present	paper	6	[82]
S Asia	Aa	Korku	present	paper	6	[84]
S Asia	Aa	Nicobars	present	paper	3	[83]
S Asia	Aa	Pardhi	present	paper	3	[31]
S Asia	An	Bugis	present	papers	12	[66, 59]
S Asia	An	Java	19th c.	book, paper	3	[85, 43]
S Asia	An	Madura	present	paper	6	[25]
S Asia	An	Malay	present	paper	3	[39]
S Asia	An	Mandar	present	paper	6	[66]
S Asia	In	India moon st.	< 500 BC	book, dataset	21	[8, 88]
S Asia	mseA	Thai	present	paper	9	[59]
E Asia	C	China medieval	1092 AD	chart, book	245	[62, 88]
E Asia	C	China	1756-1950	chart, book	252	[62, 88]
E Asia	C	Japan moon st.	8th c.	chart, paper	27	[67, 88]
E Asia	C	Korea	1395	chart, dataset	218	[88]
E Asia	M	Mongolia	present	dataset	4	[88]
Eurasia	M	Russia	present	book	4	[75]



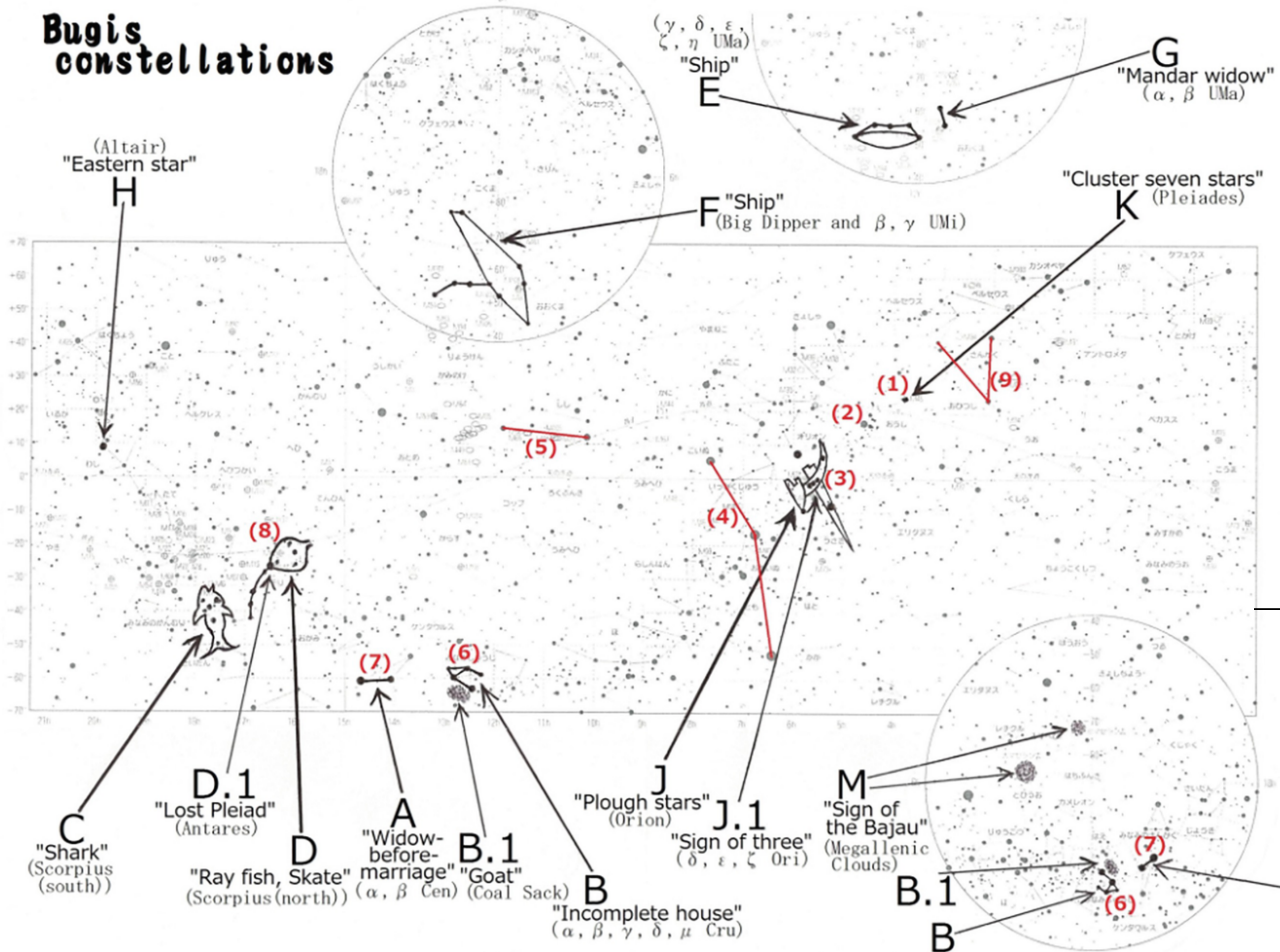
Nouvelle Uranographie ou méthode très facile pour apprendre les constellations (1786)
Alexandre Ruelle, Paris Observatory





Chris M. Cannon. Northern Dene Astronomical and Sky-Related Knowledge: A Comparative Anthropological Study. PhD thesis (2021).

Bugis constellations



Ôhashi and Orchiston. The Evolution of Local Southeast Asian Astronomy and the Influence of China, India, the Islamic World and the West (2021).

"name": "Ahtna",
"subregion": "Northern America",
"period": "2010-2021",
"place": "Cantwell, Alaska",
"source": ["cannon2021northerndene"],
"licence": "CC BY-SA",
"phylogeny": "North America",
"description": *"The Ahtna sky culture is the result of fieldwork with Northern Dene peoples, ..."*,

"constellations": [
 {
"id": "CON ahtna 001",
"names": [{"english": "That Which Moves Over Us", "native": "Nek'eltaeni"}, ...],
"lines": [{"* eta UMa", "* zet01 UMa", "* eps UMa", "* del UMa", "* alf UMa", "* bet UMa", ...}],
"certainty": "Most stars are identified, and a pictograph is drawn in the source [cannon2021northerndene]. ... It is not clear whether the abdomen should be delineated from the head with a neckline (bet Aur, alf Gem); that line is drawn here.",
"description": *"This is a meta-, whole-sky constellation; the individual body parts are explicitly separated in a table as asterisms. In local tradition, Nek'eltaeni was the first being to appear ..."*,
"semantics": ["humanoid"],
"variant_of": ...

variants

culture: Yellowknives
N America
(present)

