From climate change to language change

Over the last decades, our Earth has experienced an alarming number of extreme events, such as heatwaves, heavy rainfall, flooding, melt events, drought, forest fires, cyclones, etc. With progressing climate change, such extreme events can be expected to occur more frequently and potentially become more severe (Martin et al. 2021). A new field of study has risen from the ashes of these events: Geoanthropology studies present and past interactions between humans and the Earth system, integrating fields such as Climate science, Earth system science, Ecology, Environmental history, Archaeology, Economics, Law, Anthropology and Political sciences. In our panel, we wish to add linguistics to this list and explore the relevance of Historical Linguistics for the field of Geoanthropology.

How do climate and language connect? The link between the two lies in humans and how they respond to changing conditions and extreme events. Simply put, climate change can affect speaker populations in the following three ways.

(1) *The speaker population declines to extinction*

Disrupting subsistence industries of speakers of endangered languages, climate change is forcing these speakers to assimilate to the language and subsistence strategies of more dominant linguistic groups or to scatter around the globe, thus threatening linguistic survival. For example, as reindeer populations are threatened by climate change, reindeer herders speaking Evenki, a Tungusic language in Northeastern Siberia, are shifting not only to jobs in industry but also to the Russian language.

(2) *The speaker population migrates to a new environment*

By contrast, climate change can also increase linguistic diversity. During the Little Ice Age these Tungusic speakers expanded their territory because colder weather appears to increase reindeer populations (Hudson 2020, Robbeets & Oskolskaya 2022). Moreover, climate change can force populations to move, along with their crops and languages to search for a more viable environment. In such cases, we expect language split between the part of the speech community that stays and the part that leaves, leading to the development of separate daughter languages. The daughter language on the move can either be maintained and interact with contact languages at its new destination, or, alternatively, it can be abandoned, with speakers shifting to a new target language, spoken by a more dominant speech community in the new environment. For example, a large group of Maldivian climate refugees has moved to India or Sri Lanka. Even if the immigrants' language has received substantial influence from Tamil, Hindustani and English, they maintain Dhivehi, spoken in the Maldives, as their native language.

(3) *The speaker population adapts to the changing environment*

Even if certain speech communities manage to stay in place and maintain their native language, they will need to adapt it to the changing local environment (Frainer et al. 2020). This may involve coining new words, losing specific cultural vocabulary, lexical recycling, borrowing from better adapted speakers, etc. Ongoing climate change in Alaska, for instance, created new opportunities for agriculture. In Aleut, the agricultural verbs 'to plant' and 'to sow' are recycled from original hunter-gatherer terminology meaning 'to drop a fishing line' and 'to distribute sea-catch' (Berge 2017).

How can we extrapolate, projecting observable cases of climate-driven language change to reconstruct linguistic prehistory? Geoanthropologists use the designation "Anthropocene" as a unit of geologic time, used to describe the period when human activity started to have a significant impact on our planet's climate and ecosystems. Other suggestions for the starting date being the Industrial Revolution and the invention of the atomic bomb, some researchers argue that the Anthropocene began approximately 8 000 years ago with the development of farming and sedentary cultures (Foley et al. 2013; Smith and Zeder 2013, Renn 2020). This falls within the time frame that can be investigated by applying the traditional historical-comparative linguistic method, the practical cut-off point for this method lying around 10 000 years ago (Comrie 2000; Campbell 2000). It is no coincidence that many of the world's major language families started to disperse around the Neolithic Revolution. For instance, language families such as Bantu (Philipson 2002) , Semitic (Diakonoff 1998), Austronesian (Blust 1995, 2013; Pawley 2002; Bellwood & Dizon 2008), Transeurasian (Robbeets et al. 2021), Sino-Tibetan (Sagart et al. 2019, Zhang et al. 2020), Tai-Kadai (Ostapirat 2005), Austroasiatic (Higham 2002, Diffloth 2005, Sidwell and Blench 2011, Sagart 2011, van Driem 2017), Dravidian (Fuller 2002) Arawakan (Aikhenvald 1999), Otomanguean (Kaufman 1990, Brown et al. 2013a/b, 2014a/b) are argued to owe their primary dispersal to the adoption of agriculture by their early speakers. The link between postglacial warming and farming/language dispersals is generally accepted (Richerson et al. 2001, Bellwood 2022: 150) but it remains to be investigated how climate versatility and extreme events in specific regions may have influenced language loss, change and dispersal.

Our panel proposes a wide range of questions stressing the need of case studies that illustrate in what ways climate reshaped individual languages and language families across the world.

Is climate change threatening certain languages and accelerating language loss of already endangered languages? Can climate change also have a positive effect on linguistic diversity, leading to the birth of new daughter languages? What is the relation between the reduction of biological, cultural and linguistic diversity through climate change? What is the reason for/ mechanism behind the correlations? Can the conservation of species be expected to lead to the conservation of languages? Can regions that have high biodiversity be linked to the development of linguistic diversity? Can we correlate established periods of climate change in a certain region in prehistory with periods of linguistic dispersal and language loss? Do dated trees of individual language families support such a correlation? Can we extrapolate our understanding of climate-driven language change not only to reconstruct the past but also to predict the future? In what way and to which extent did the emergence of the Anthropocene impact language loss, dispersal and change? What is the influence of extreme events on language diversification? Can the impact of extreme events be modeled, for instance by Dixon's (1997) equilibrium/punctuation model or by Hudson's (2017) adaptive cycle model? Are there case studies that illustrate the impact of extreme events on language change? What is the impact of time on climate-driven language change? Is it reasonable to expect that linguistic diversity will restore at a higher speed than biological diversity? What is the role of climate in proposals like "the Farming/Language Dispersal Hypothesis" (Bellwood & Renfrew 2002), which posits that many of the world's major language families owe their dispersal to the adoption of agriculture by their early speakers?

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