

## *Languages, ecology and climate change: Worldwide perspectives and the test-case of the Andes*

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This workshop raises a series of open questions on climate change and language(s). Here I explore illustrative cases from around the world that offer valuable perspectives on several of these big-picture questions.

Research into the world linguistic panorama, and on how it came to be, has long looked for correlations with ecology, articulated especially through the subsistence strategies practised by different speaker populations. Most far-reaching is the farming/language dispersals hypothesis, invoked to account for how just a few language families expanded so spectacularly — and drove other language lineages, and overall human linguistic diversity, into decline. In effect, this hypothesis looks to climate change as an ultimate driver, for it was only once post-glacial warming took hold that agriculture emerged at all, repeatedly and independently.

The correlation is not so straightforward or immediate, however. Many language families hypothesised as spread by early farmers do not in fact seem to have started expanding until long after agriculture first began in the regions concerned, even by up to a few millennia. Alternative hypotheses stress later phases of intensification, secondary products, or specialisations (e.g., to pastoralism), which themselves may arise in response to ongoing climate changes.

So as this contrast already illustrates, the basic question is not whether links between languages and ecology exist, for they clearly do. Rather, it is about how far those links either point to environmental determinism, or reflect how human societies have responded to their ecological contexts and challenges, to mitigate and even take advantage of them. The contrasting fates of human language lineages through prehistory may in part record failed or successful responses to ecology. The parallels with the debate on the Anthropocene, and when it began, are striking. For our language diversity, too, has over time been transformed (and increasingly destroyed) by our own human impacts. Today's globalization marks an acceleration, but of a linguistic transformation that began many millennia ago.

Language-ecology relationships can differ greatly in causation and scale, however. Some language expansions are hypothesised as driven by one-off, extreme 'punctuation' events, such as the White River Ash volcanic eruptions pushing Athabaskan speakers southwards (Workman 1974), or a possible role for a 'Black Sea deluge' in spreading early Indo-European (see Nichols 2007). Even short-term events, if extreme enough, can have long-term linguistic consequences. Sometimes, humans also induce their own ecological collapses — although of the five cases explored by Diamond (2005), only one led to language extinction (of Greenlandic Norse). It is a different, much broader question how far linguistic fates have been shaped by full-blown climate-change, more gradually over far longer time-scales.

Many of these questions are ideally illustrated in one particular part of the world, where topography and the Tropics conspire to fashion a natural laboratory of ecological extremes and diversity, in immediate proximity. Out of the rainforest of Amazonia, the dry Andes rise rapidly to host the highest farmable lands on Earth, before dropping swiftly away to a coastal desert, but fringed by the superabundant waters of the Pacific. In this microcosm of extreme and fragile ecologies, a pristine civilisation arose, perhaps even before farming, and followed a tumultuous trajectory through both sudden and longer-term climate perturbances. This makes for an ideal test-case in how far language distributions may have been shaped by climate changes, or largely resistant to them, where their speakers ingeniously adapted to attenuate and harness the ecological challenges.

Generally, language distributions align with the stark differences between Amazonia, the Andes, and the Pacific Coast. The first complex societies, on the coast, did not spread their languages beyond the ecological limitations they faced. Major language expansions came only once complex societies in the highlands so transformed the Andean landscape, by terracing and irrigation, as to raise carrying capacity, expand demographically, and take their languages with them. The very name of the major surviving language family of the Americas, Quechua, originally denoted an ecological zone, the qicwa mid-elevations ideal for cultivating what became the primary staple, maize. The grasslands of the higher puna zone, meanwhile, suited pastoralism better, once camelids like the llama had been domesticated, as well as tuber crops like the potato. These underpinned the Tiwanaku culture around Lake Titicaca, up until its collapse, widely attributed to climate change. Yet this did not efface their language, Puquina, although it did leave it vulnerable to the later power of the Incas, and their mastery of the Andean environment. The Incas even named languages, too, in 'ecological' terms (Itier 2015). They also resettled populations en masse far across their Empire, but often deliberately into regions ecologically similar to their homelands, and taking their Quechua and Aymara languages with them.

### *References*

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