Contact, Climate Change and the Dispersal of Proto-Sino-Tibetan

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From a likely origin in the Yangshao Culture of north central China from circa 7K-5K YBP (Wang 1998), the Proto-Sino-Tibetan (PST) community migrated and divided rapidly during times of ancient climate change. Their initial agriculture was mainly based on *Setaria* and *Panicum* millet, and their domestic animals were dogs, pigs and from circa 5.6K YBP *Bos taurus* cows introduced from the west (Liu & Chen 2012, Brunson et al. 2020). Etyma for these two crops and three domestic animals are reconstructed for PST (Bradley 2011, 2016, 2022). There were two main offshoots of Yangshao Culture: Majiayao Culture from circa 5.3K YBP to the west, probably corresponding to Proto-Tibeto-Burman (PTB), and Longshan Culture from circa 5K YBP to the east, probably corresponding to Sinitic. The PST COW etymon ***ŋwə** thus supports dating the PTB/Sinitic split to after 5.6K YBP. Rice was first domesticated in the lower Yangtse area by circa 6K YBP and only later spread northwest to late Yangshao and early Majiayao cultures (Fuller et al. 2007). Thus there are no PST etyma for rice; however there are various PTB etyma, as well as various semantic shifts in Sinitic as rice became a major crop.

Subsequent migrations were shaped by climate change; firstly, a warm and wet climate from circa 5K YBP, which permitted cultivation of these crops at higher altitudes in eastern Tibet and western Sichuan (d'Alpoim Guedes et al. 2014, 2016). Later periods of cooling climate (Cheung et al. 2019, Chen et al. 2020) perhaps triggered further migrations beyond southwest China, with the Karenic subgroup reaching west Southeast Asia and the Central subgroup reaching northeast South Asia. The most recent such change was the cool period of the 'Little Ice Age', circa 1280 to 1400 AD (Gamble et al. 2022). Ecological changes led to shifts in crops and domestic animals, with contact introducing some new crops and animals. This discussion will trace the lexical outcomes for crop and domestic animal vocabulary and show how archaeologically documented dates for contact-introduced and newly-domesticated crops and animals and paleoclimate information can assist to date the early phylogeny of PST.

Two crops arrived from the west circa 4.5K YBP: *Triticum* and *Hordeum.* Unlike *Setaria* and *Panicum*, these can adapt to cooler climate, so their cultivation spread and increased rapidly with cooling climate from circa 4.2K YBP. Rice was also more suitable for some new ecological niches. Two domestic animals also adaptable to cooler climate, sheep and goats, were introduced from the west circa 4.4K YBP (Liu & Chen 2012). The subgroup of PTB which on independent comparative evidence appears to have separated first from PTB, Karenic, lacks cognates of PTB etyma for WHEAT, BARLEY and GOAT; thus the split of Karenic from PTB may have preceded 4.5K YBP.

Bos grunniens (yak) was probably domesticated by 3.65K YBP (Jacques et al. 2021) and cultivation of *Hordeum vulgare* var. *nudum*, a variety of barley suitable for cold climate (d'Alpoim-Guedes et al. 2015, Zeng et al. 2015) developed in parts of the area during expansion into higher-altitude environments such as the Karuo Culture, and expanded during the cold climate period from circa 3.5K YBP. The horse was introduced from the west into China circa 3.3K YBP (Liu & Chen 2012). *Fagopyrum* (buckwheat) cultivation started in upland southwest China by circa 3.15K YBP (Xue et al. 2022). These developments are reflected by the distribution of etyma for these crops and animals among TB languages. A YAK etymon has cognates in Eastern and Western TB but not Central TB. Western TB and Eastern TB have distinct BUCKWHEAT etyma; the latter is borrowed into Chinese. The forms for HORSE are loans, with a wide variety of alternative forms, including various

similar Eastern TB forms, a completely different Western TB form, also Indic loans in Central TB and some Western TB languages south of the Himalayas, and another form in Karenic languages. Overall, this suggests that the second split within PTB was Central TB, perhaps associated with the 4.2K YBP climate cooling, followed by a later split between Western and Eastern TB associated with the 3.5K YBP climate cooling, after the domestication of the yak but before the introduction of the horse circa 3.3K YBP and before the domestication of buckwheat.

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