

# Epiphytic lichens and climate change

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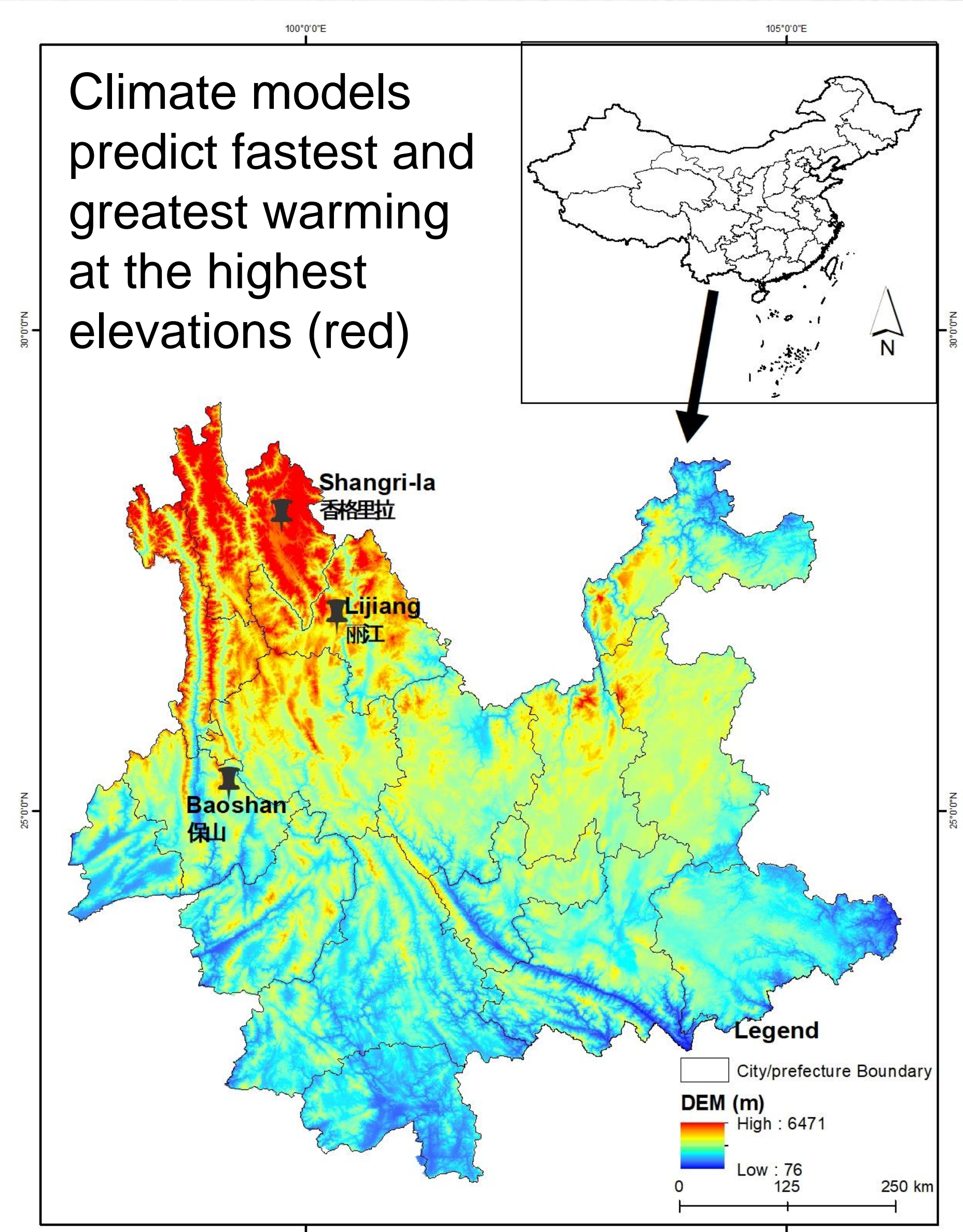
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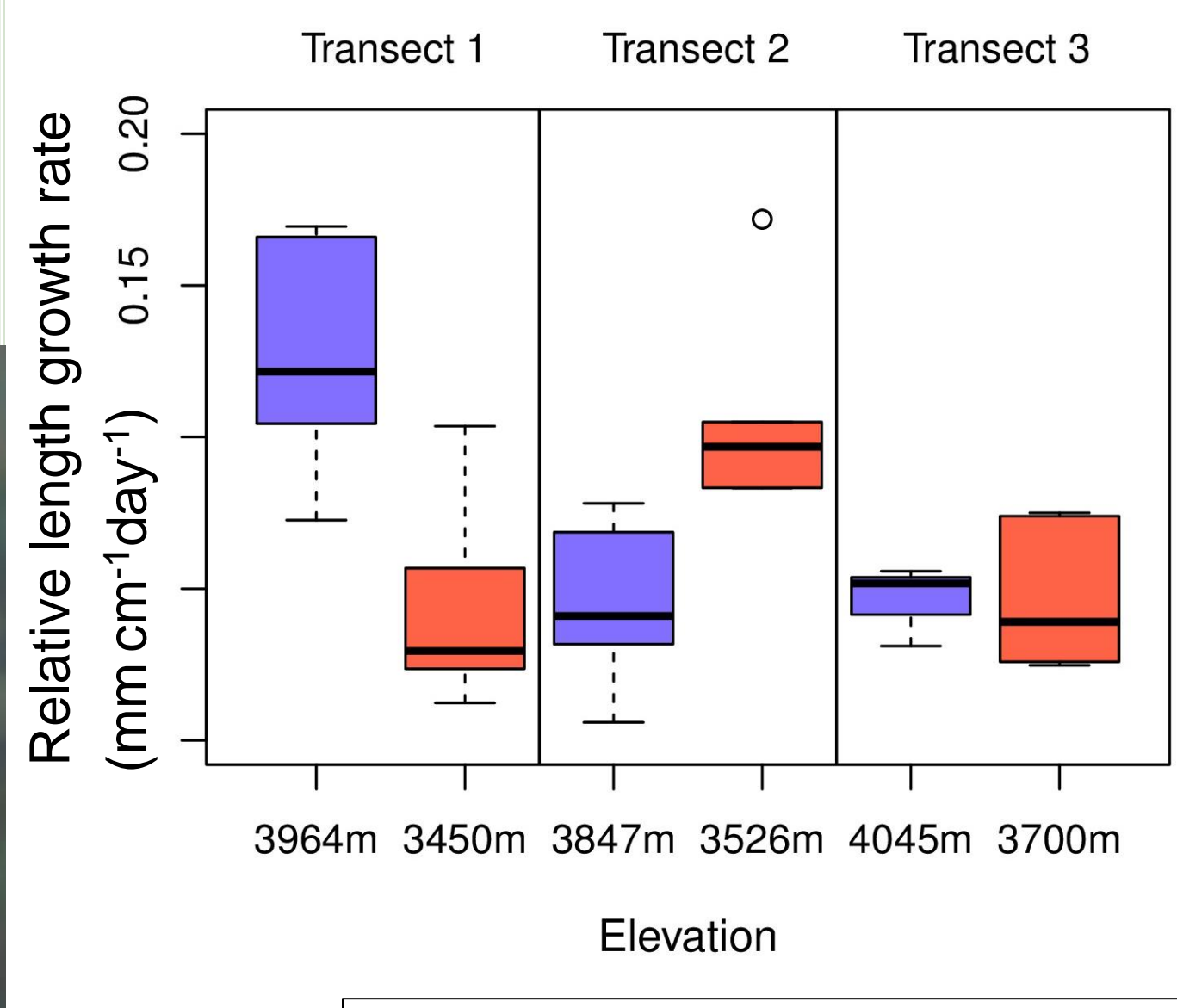
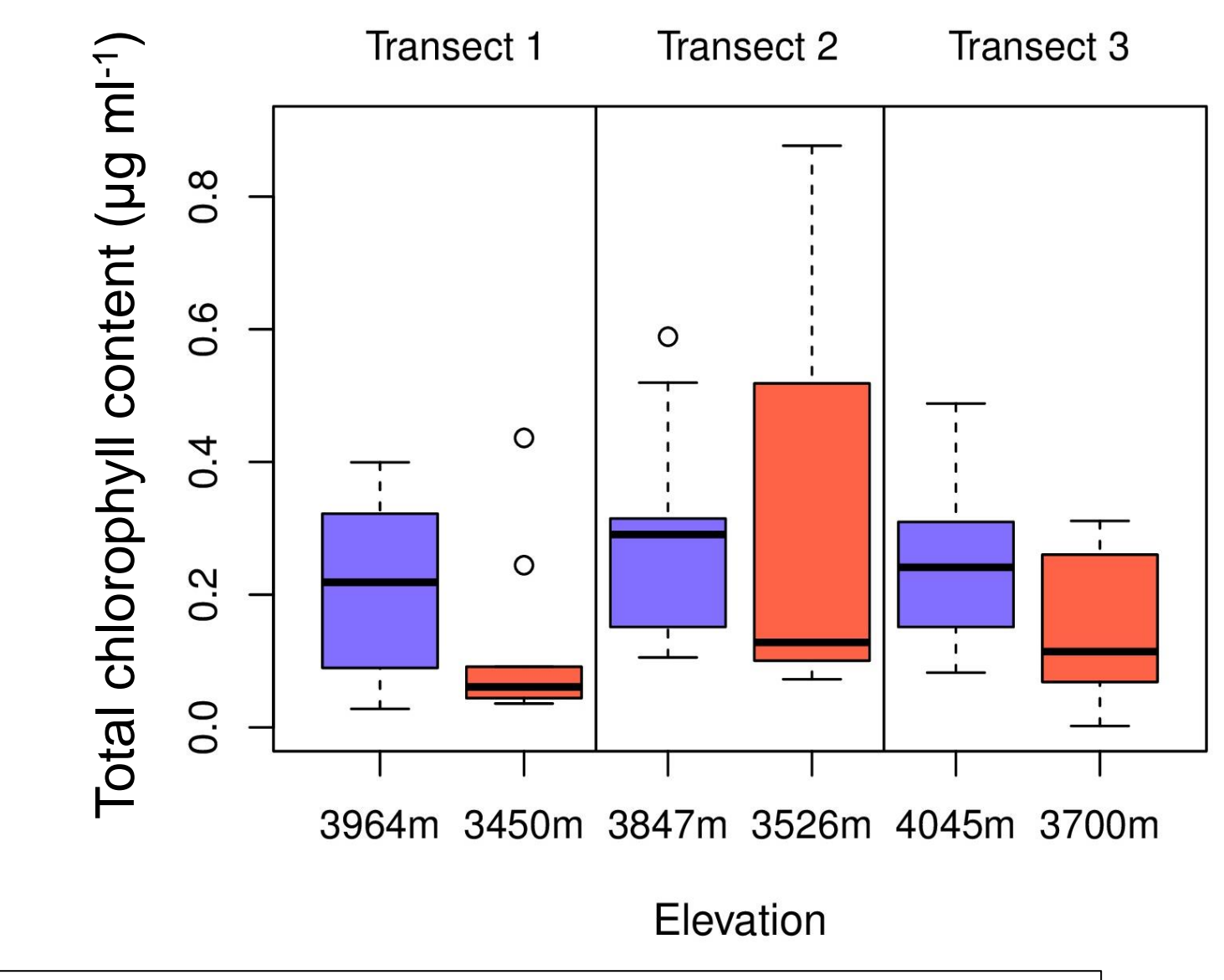


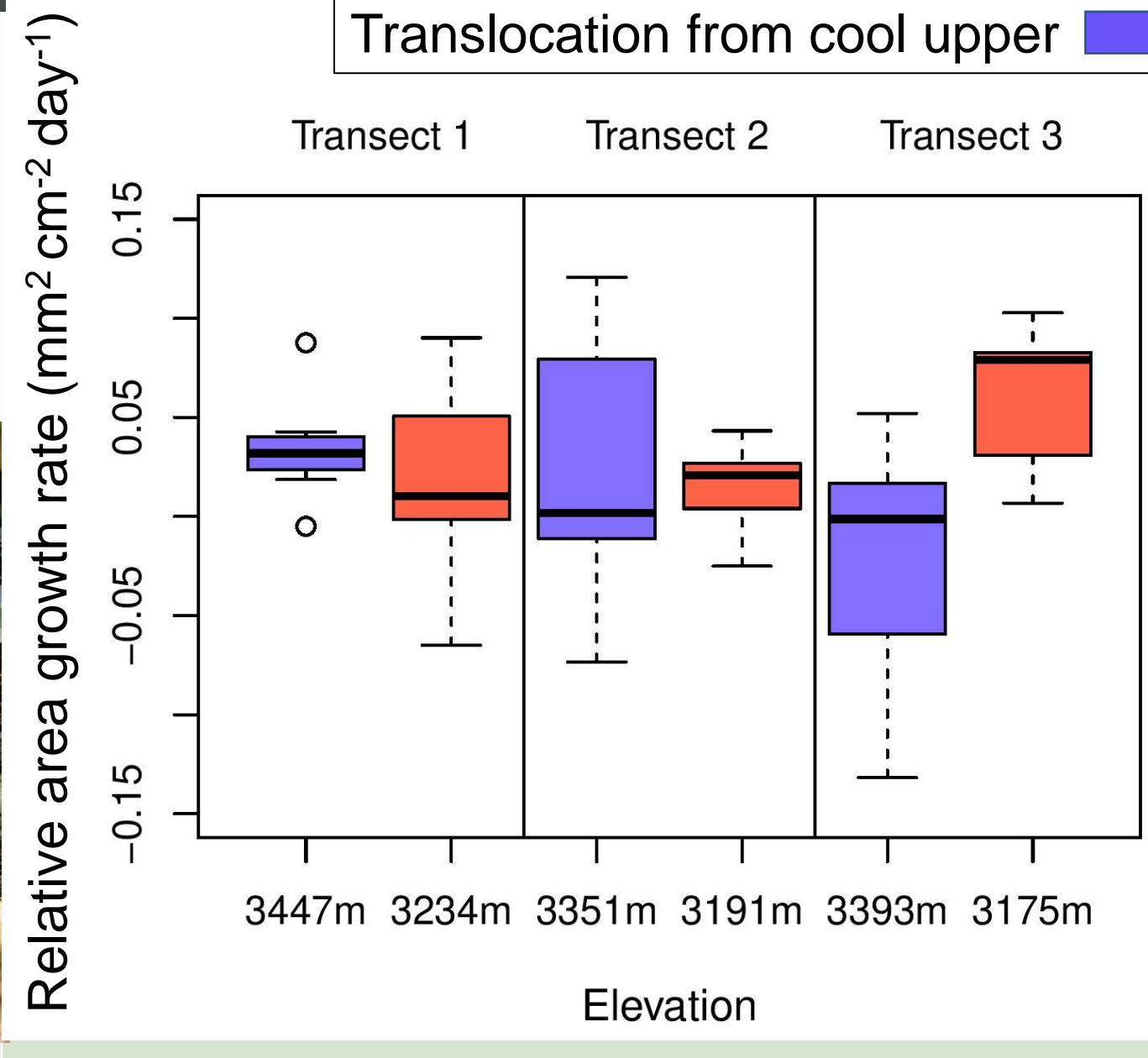
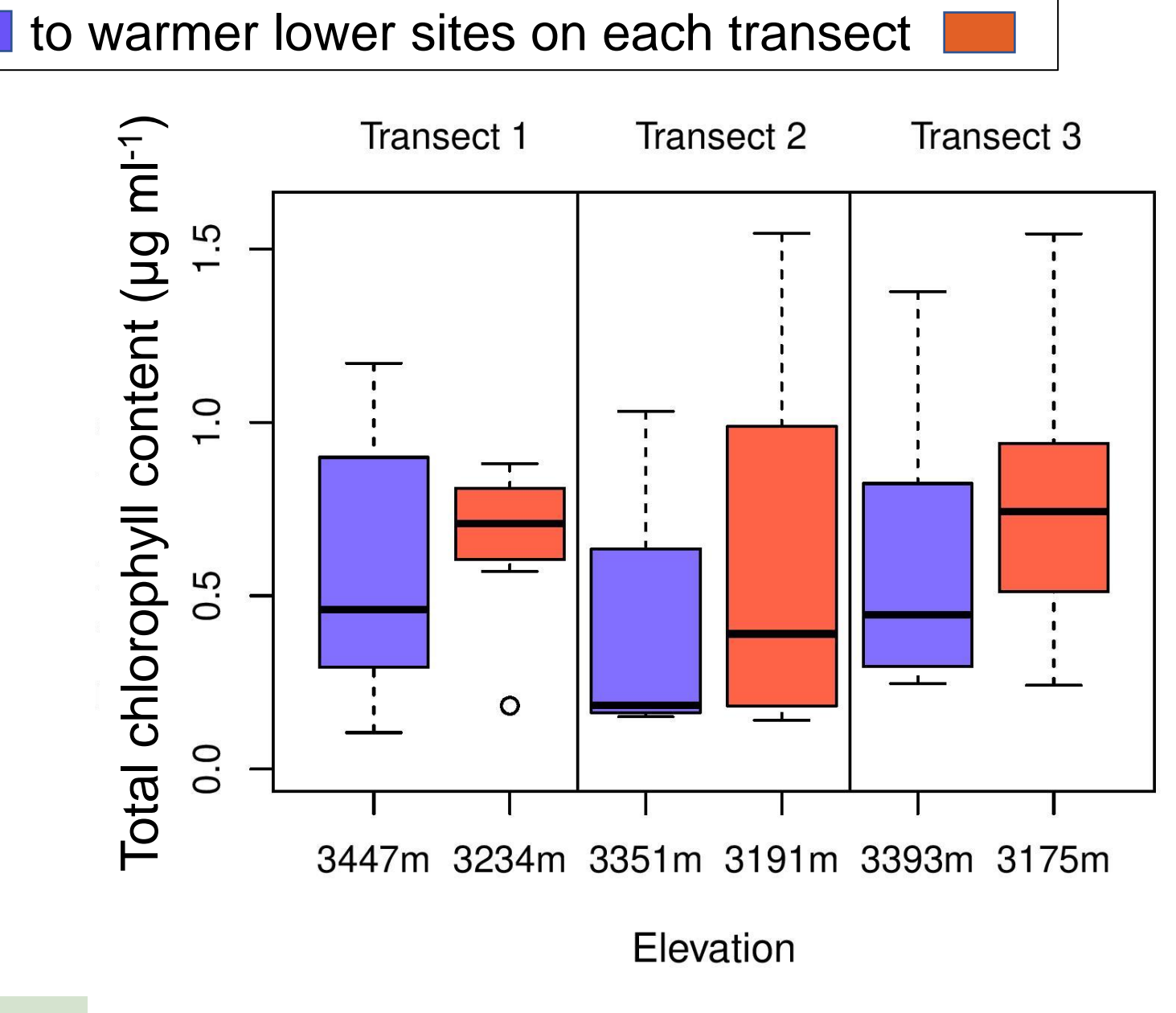


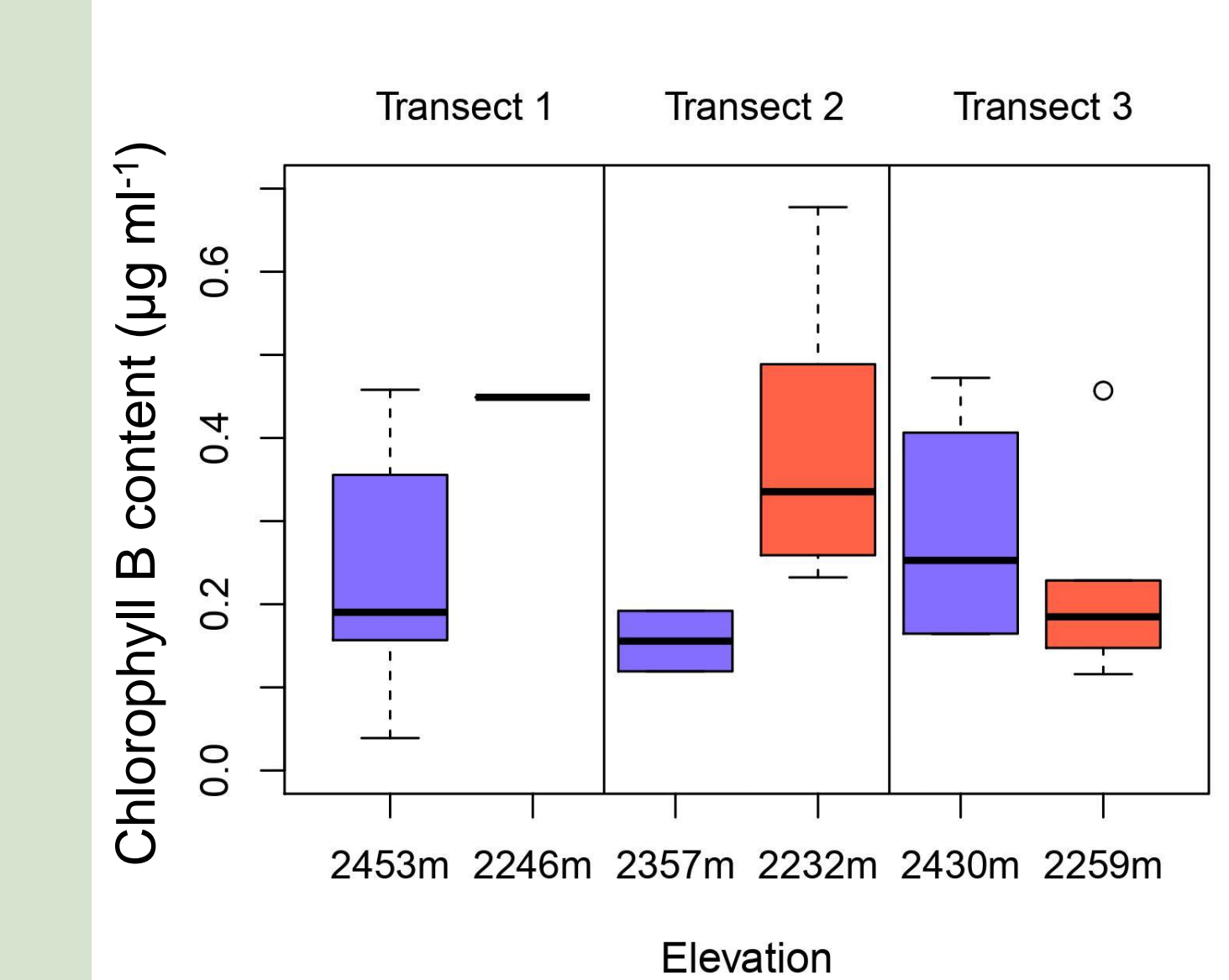
**High biological diversity** of natural forests includes many epiphytes, which are often host-specific. Epiphytic lichens are especially sensitive to atmospheric changes, as they rely completely on the atmosphere for water, carbon, nitrogen and other nutrients.

Lichens are often overlooked as small relative to host trees, but their biomass can be extensive. They may make a substantial total contribution to the **global carbon budget**. Reduced growth or increased decay could turn them from carbon sink to source.

They are also considered **indicator species**, providing early warning of climate changes. Their loss would seriously impact forest ecosystems, due to their roles in moisture interception and nutrient cycling. Yunnan Province, China, has **remnant mature forests** supporting many epiphytic lichen species. Several are used as food and medicine by local people, and are food sources for endangered wildlife.

Northwestern Yunnan presents a **natural elevation gradient**. We selected three sites: Shangri La, Lijiang and Baoshan. We translocated nine lichen species down transects from near the tree-line to the lowest elevation with similar tree assemblages, to **simulate future climates**. Over three years we recorded changes in the survival, growth and chlorophyll of translocated specimens. These species responded differently to simulated climate change. Responses differed between transects, indicating that epiphytes response to rising temperatures will be site and species specific. Here we give one example from each site.



Species	Local uses	Growth	Chlorophyll	Host tree
<b><i>Dolichousnea longissima</i></b> Site: Shangri La 	Eaten as salad Food of the endangered Yunnan snub-nosed monkey. 			Grew on <i>Abies</i> , <i>Acer</i> , <i>Betula</i> and <i>Rhododendron</i> host tree species
<b><i>Dendroscosticta platyphylla</i></b> Site: Lijiang 	Large, flat thalli make it a sensitive bioindicator 			Grew equally well on <i>Quercus</i> , <i>Salix</i> and <i>Rhododendron</i> species. Failed to grow on host trees of <i>Pinus</i> species
<b><i>Ramalina conduplicans</i></b> Site: Baoshan 	Eaten as salad. Anti-inflammatory and antibiotic 	No significant change in growth with warming		All host trees were <i>Pinus</i>