

VALIDATION OF A CDF-T BIAS CORRECTION METHOD USING PALEO-DATA FOR THE MID-HOLOCENE AND THE LAST GLACIAL MAXIMUM

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- Based on cumulative distribution functions (CDF) transformation (*Vrac et al., 2012*)
- Extension of quantile-quantile correction method
- **Advantage:** provides bias correction with the preservation of the raw ensemble
- **Was not previously applied to paleoclimate**

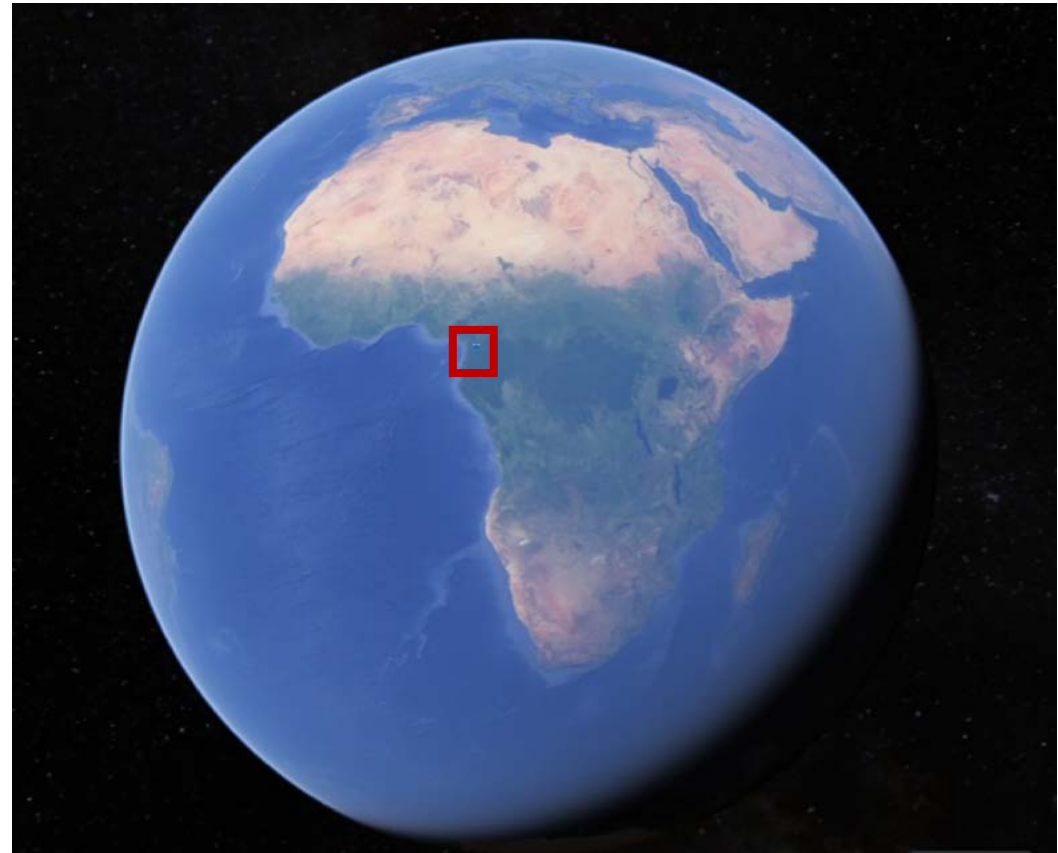
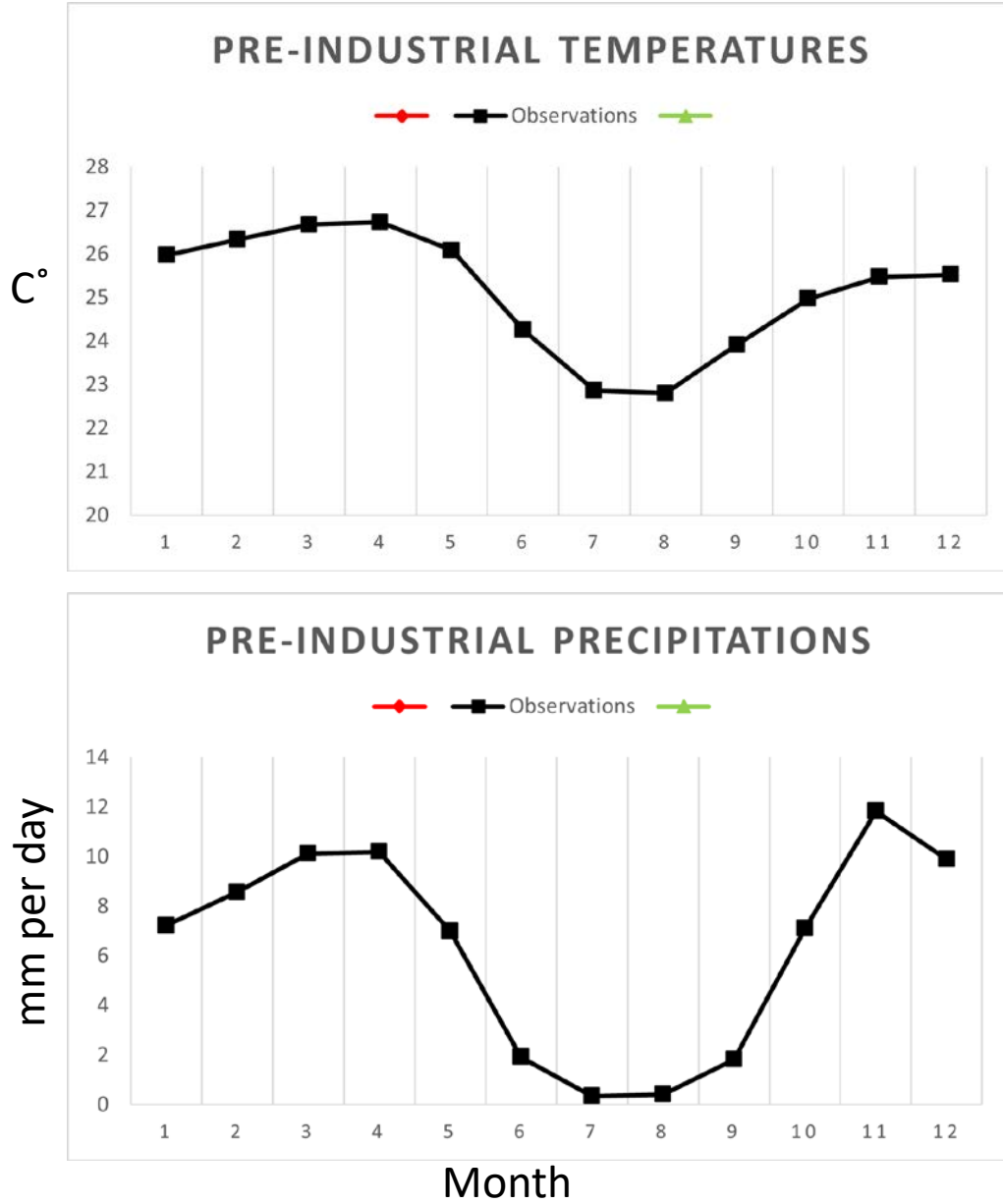
Case study



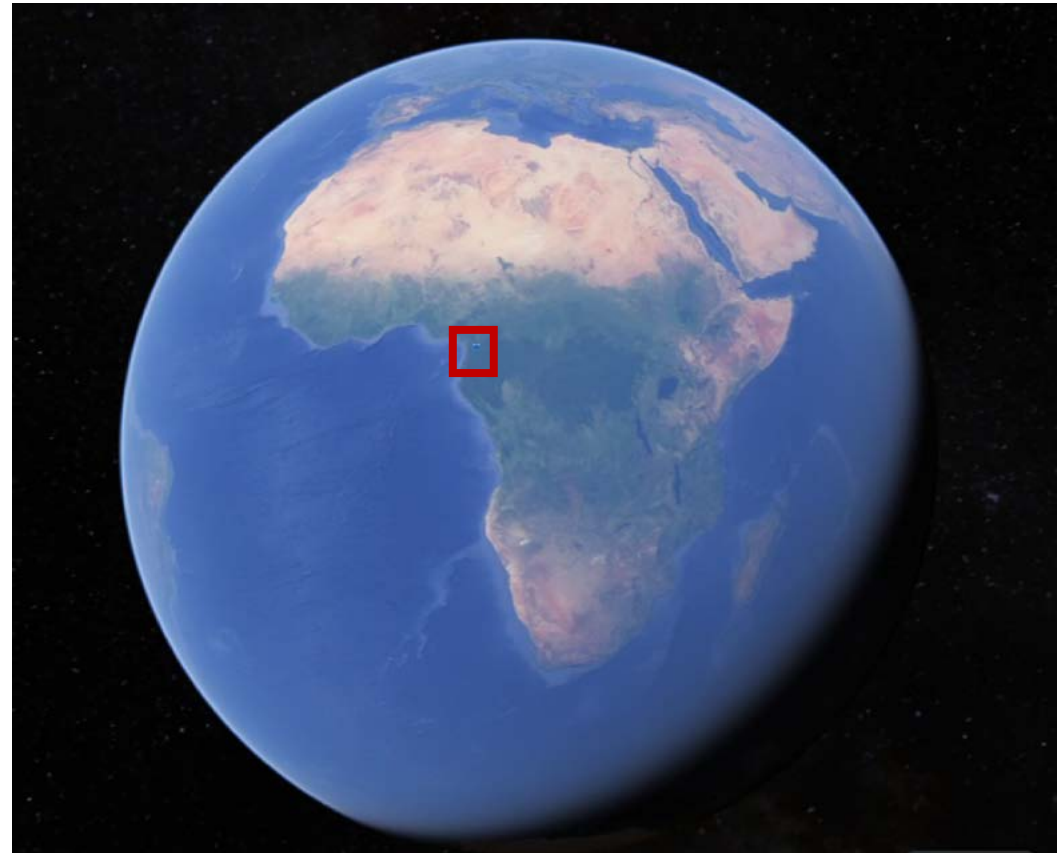
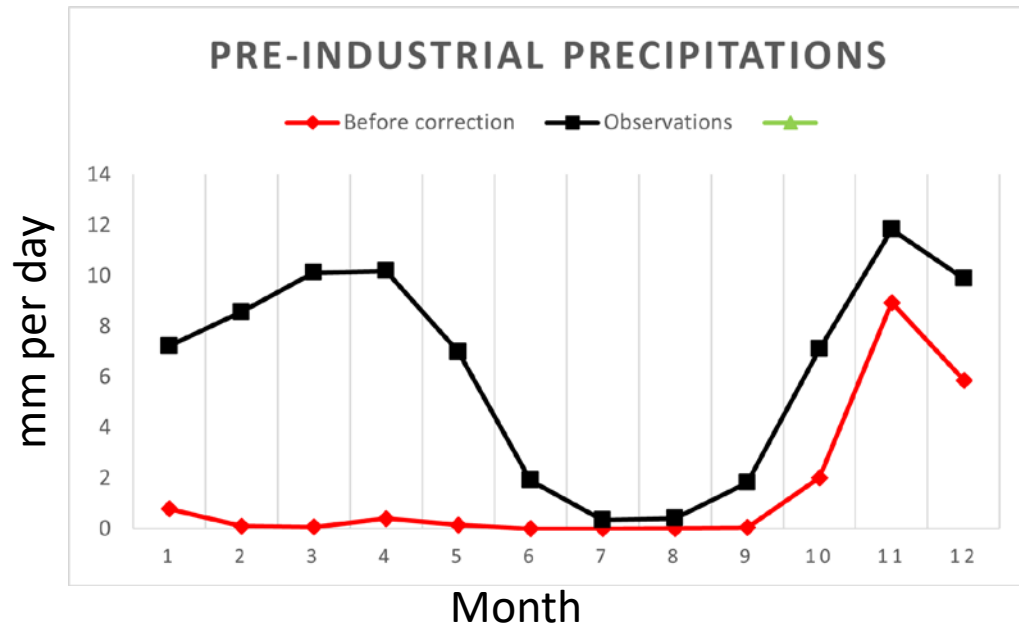
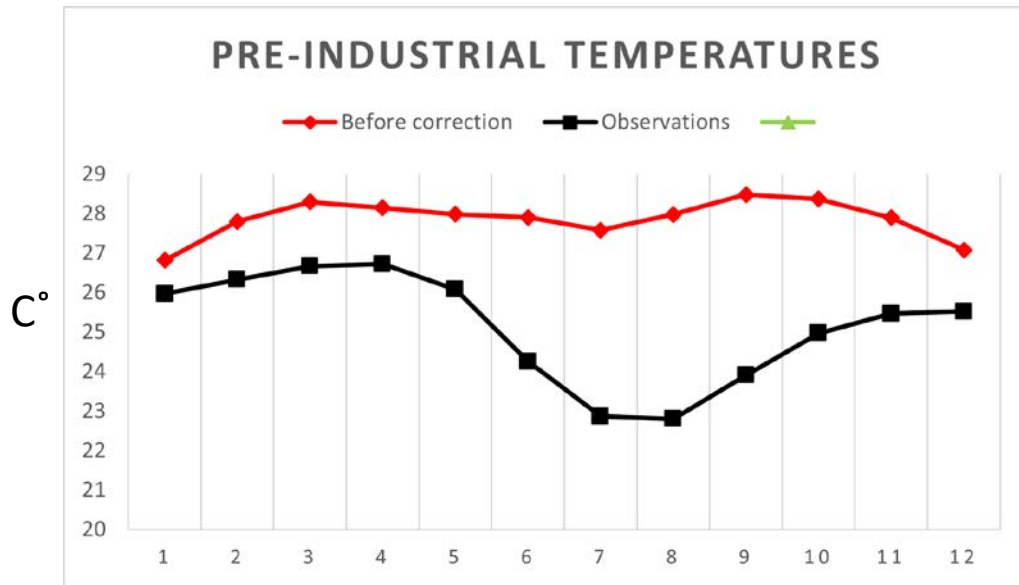
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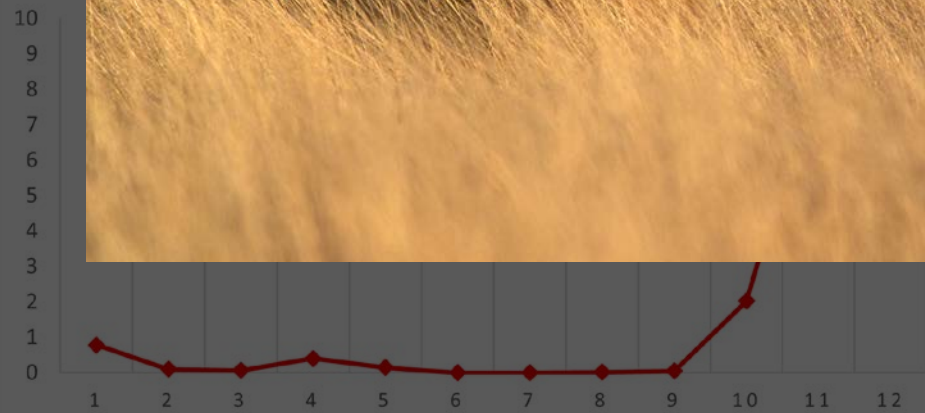
Case study



Case study

PRE-INDUSTRIAL TEMPERATURES

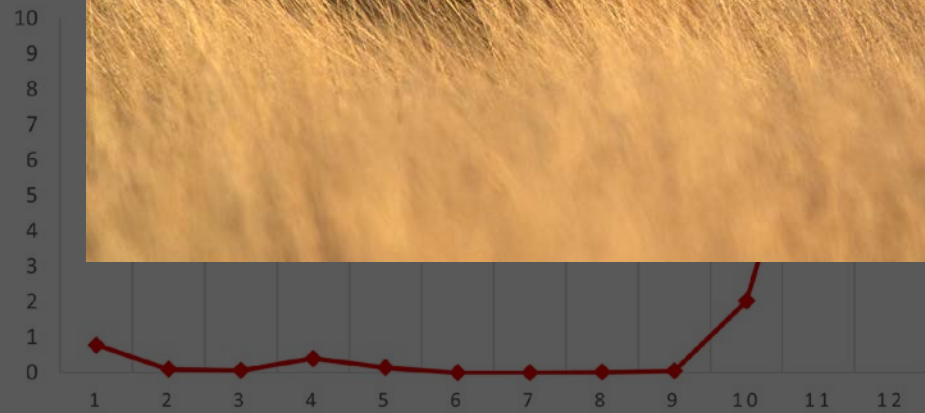
Before correction



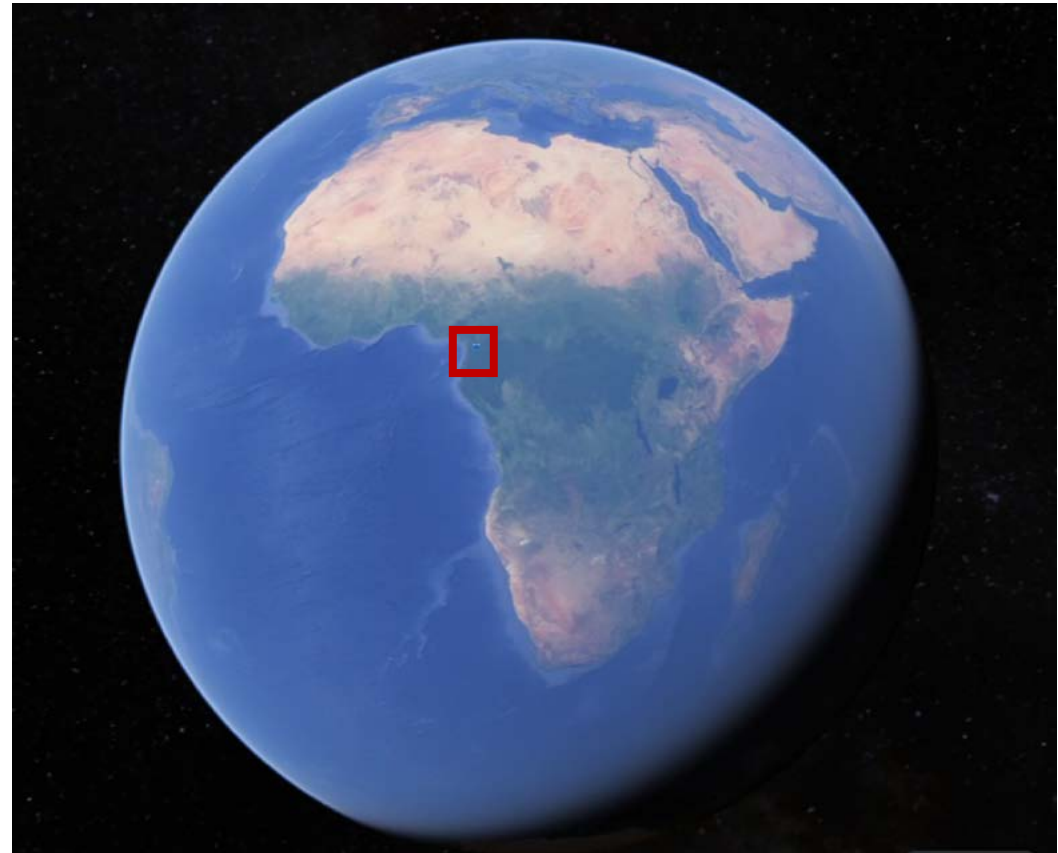
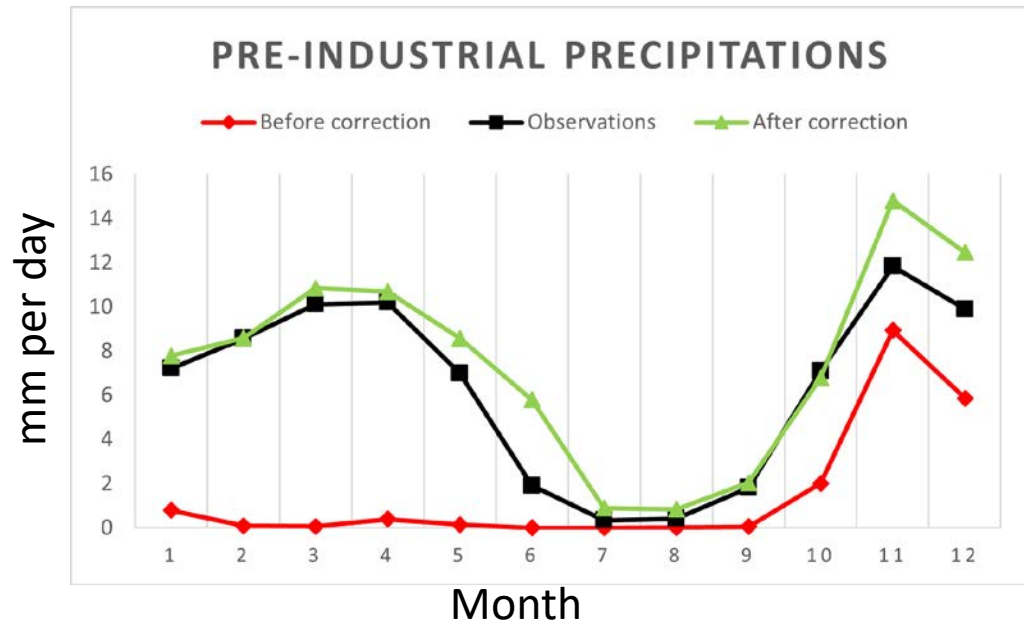
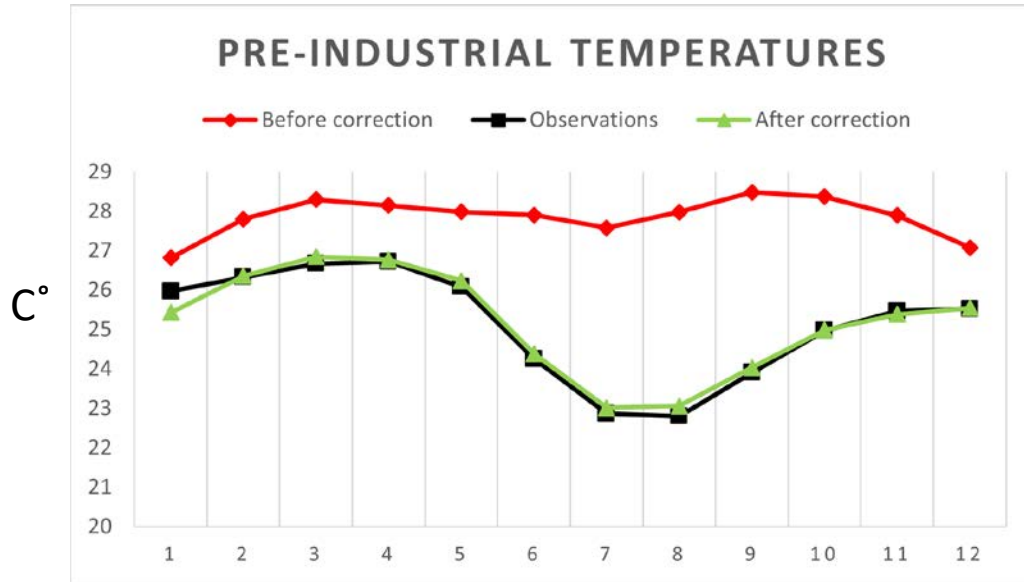
Case study

PRE-INDUSTRIAL TEMPERATURES

Before correction



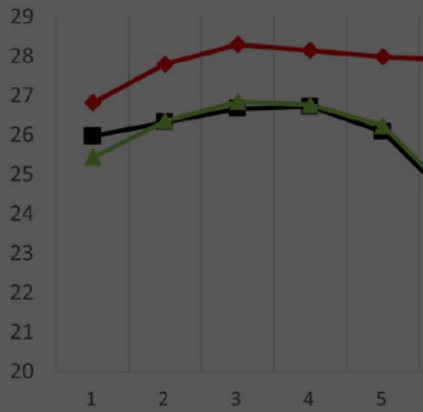
Case study



Case study

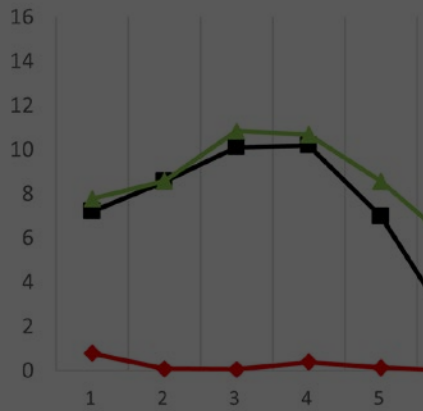
PRE-INDUSTRIAL TEMPERATURES

Before correction Observations After correction



PRE-INDUSTRIAL

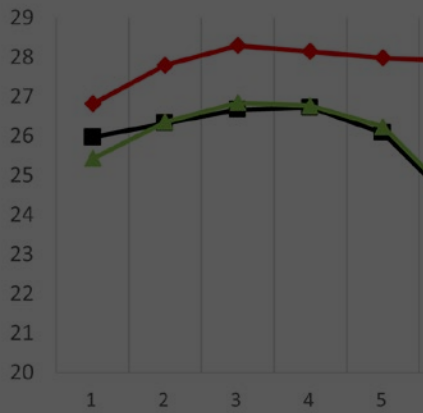
Before correction Observations



Case study

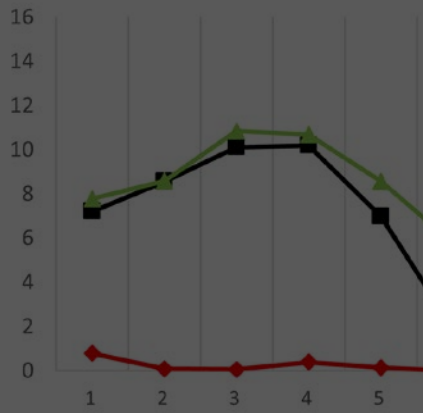
PRE-INDUSTRIAL TEMPERATURES

Before correction Observations After correction

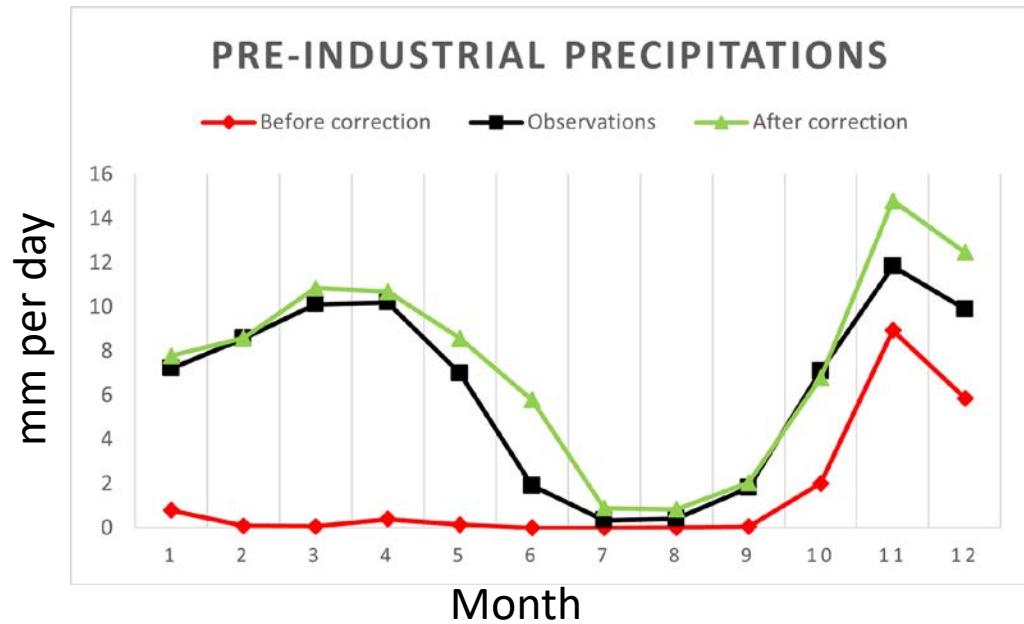
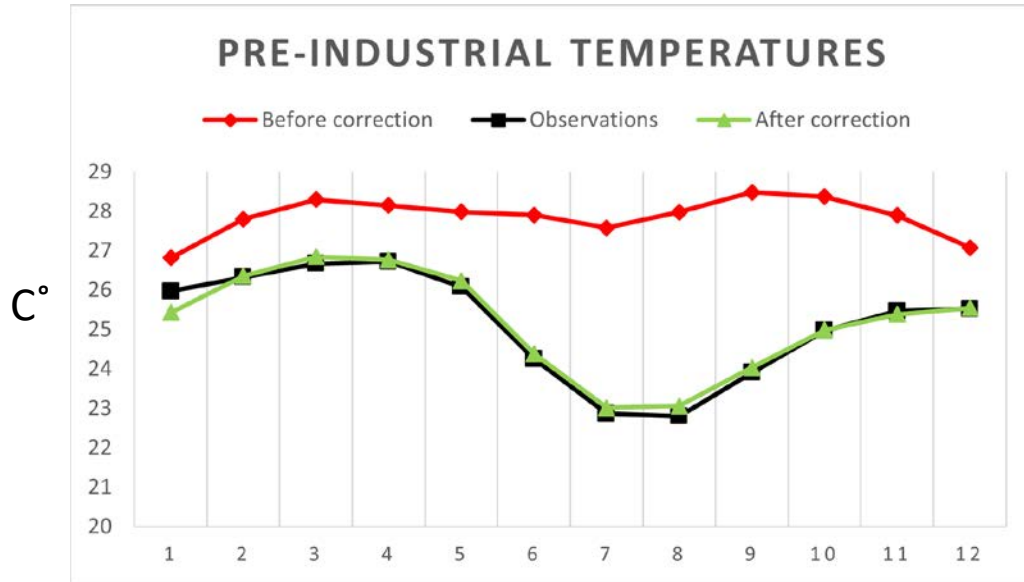


PRE-INDUSTRIAL

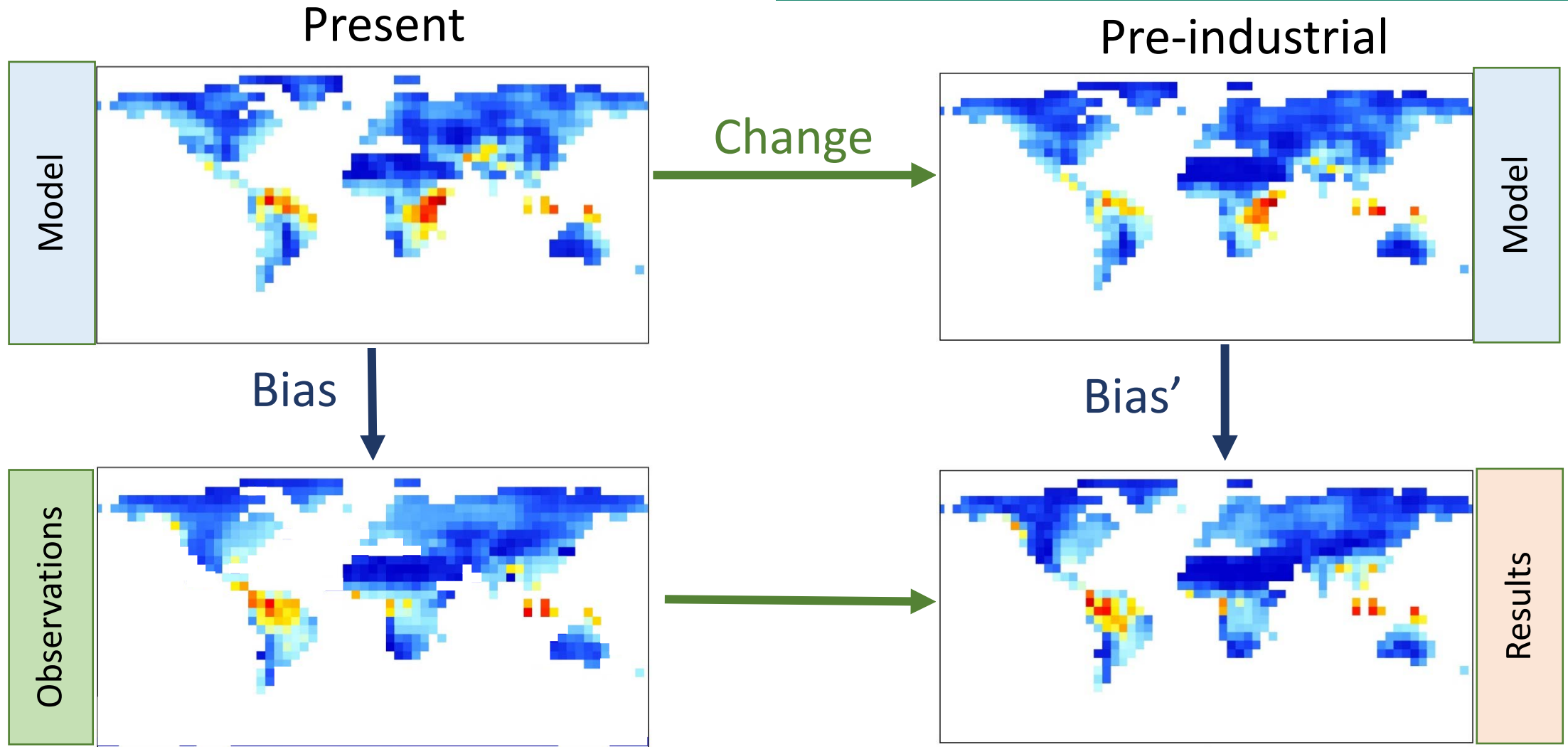
Before correction Observations After correction



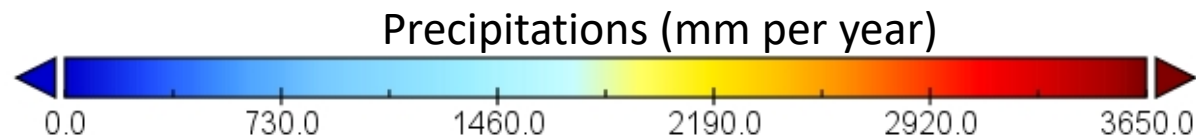
Case study



Bias correction



Assumption:
 $\text{Bias} = \text{Bias}'$



Time period:

PI (control)

Mid-Holocene

LGM

Time period:

PI (control)

Mid-Holocene

LGM

Grid:

$5.625^{\circ} \times 5.625^{\circ}$

$0.25^{\circ} \times 0.25^{\circ}$

Evaluation

Inverse approach



Comparison with
paleotemperature
reconstructions of
Kaufman et al (2020)

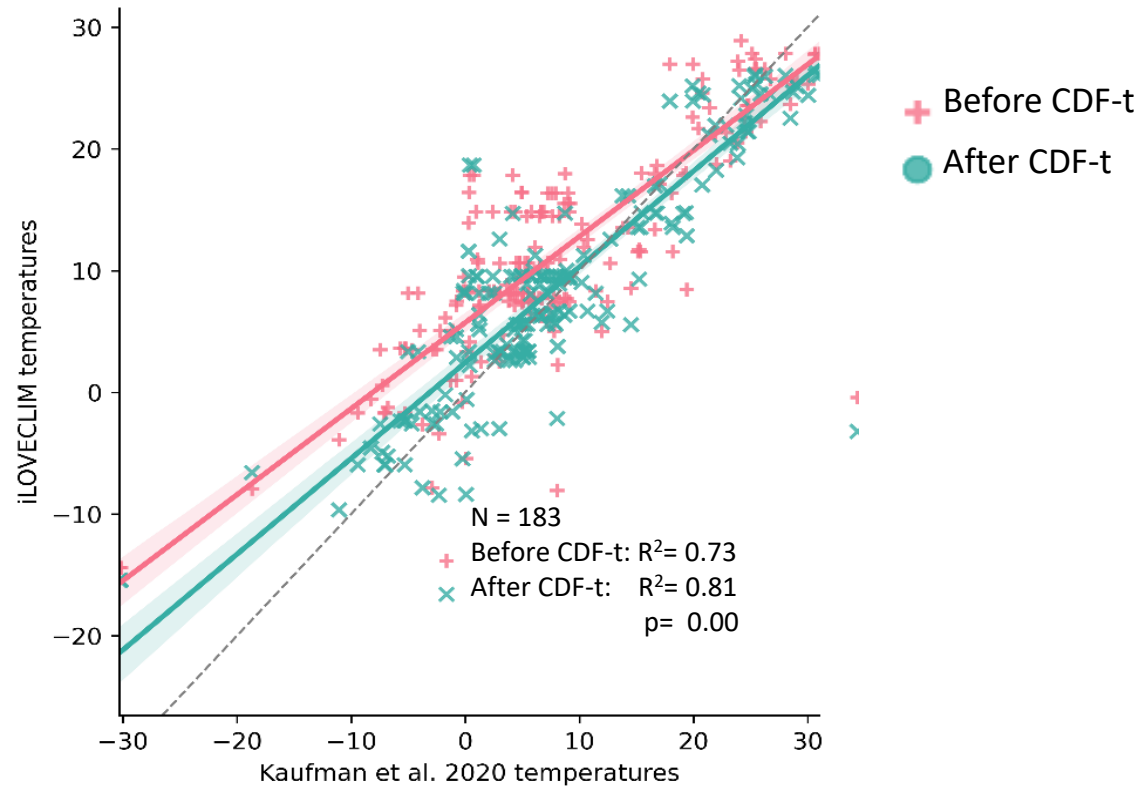
Forward approach



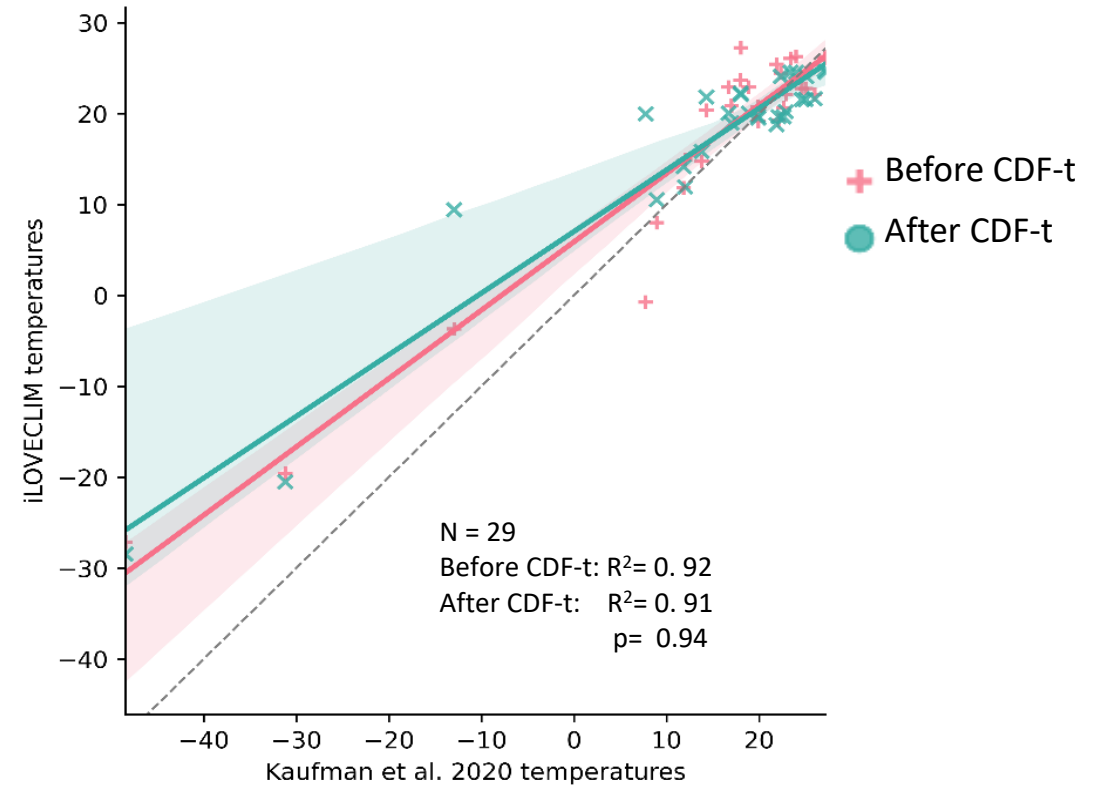
Comparison with
pollen-based **vegetation**
reconstructions
BIOME6000

Inverse approach

Mid-Holocene



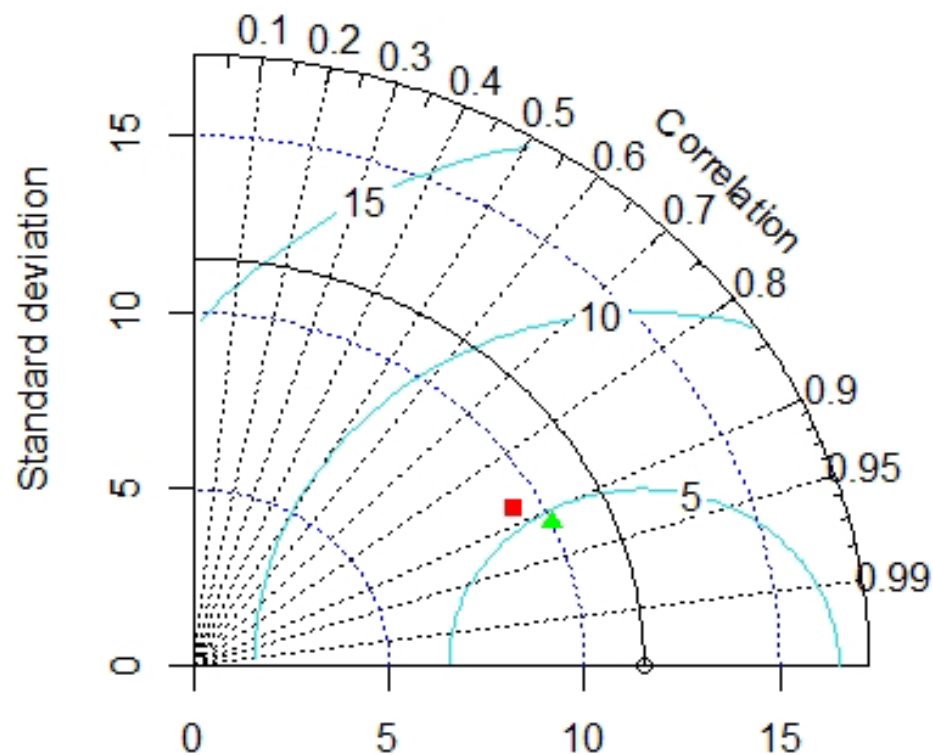
LGM



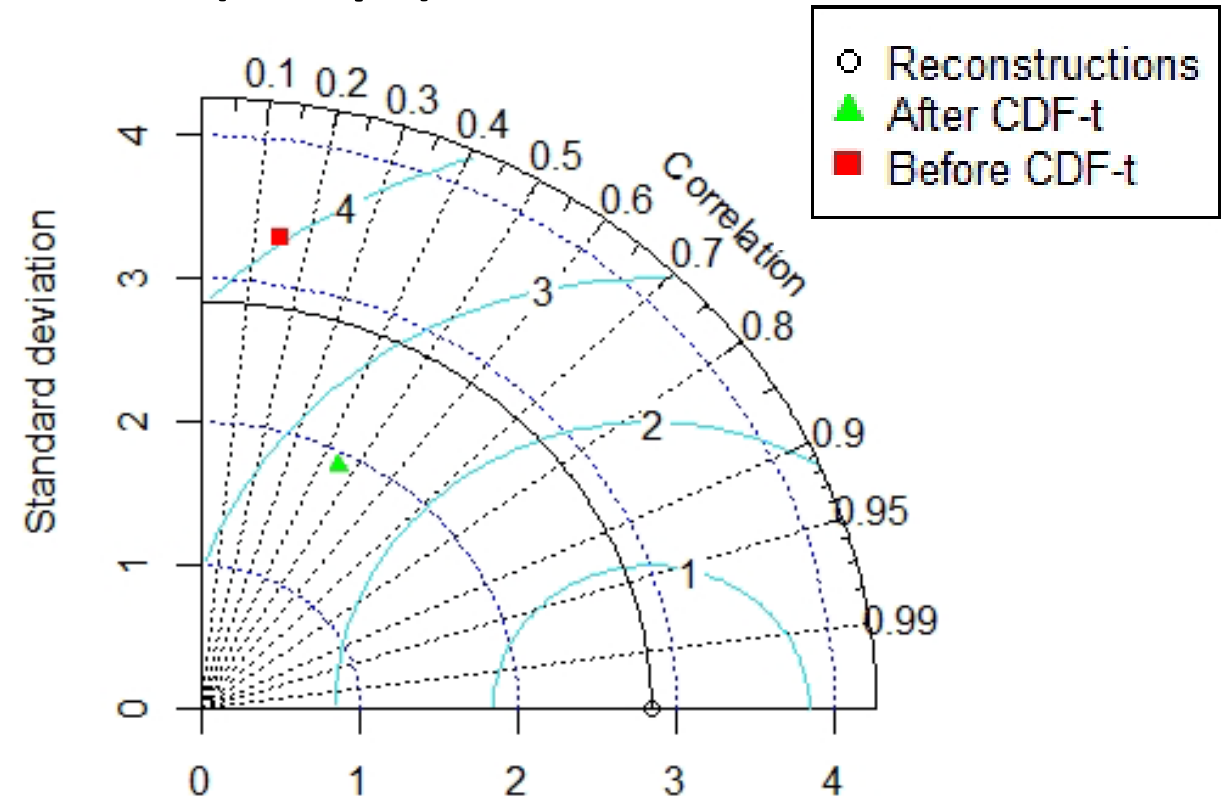
Reconstructions: paleotemperatures from Kaufman et al (2020)

Inverse approach

Mid-Holocene 5.625° grid
(world)



Mid-Holocene 0.25° grid
(Europe)



Reconstructions: paleotemperatures from Kaufman et al (2020)

Forward approach

Matching ratios between biomes in pollen reconstructions (BIOME6000) and biomes predicted by the CARAIB model, in %

	PI 0.25°	MH 0.25°	PI 5.625°	MH 5.625°	LGM 5.625°
Before CDF-t correction	18%*	31%*	36%	38%*	22%
After CDF-t correction	44%*	40%*	36%	44%*	25%

* statictically significant improvement

Conclusions

**Corrects systemic
biases**

**Downscaling
enhances bias
correction**

**No improvement at
LGM**

**Further testing
required**



Thank you for your attention!
