

*The following supplement accompanies the article*

## **Validation of ELPIS 1980–2010 baseline scenarios using the observed European Climate Assessment data set**

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*Climate Research 57: 1–9 (2013)*

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### **Supplement. Additional data**

Table S1. Characteristics of 4 ECA sites with large precipitation biases

Site	Longitude	Latitude	Site altitude (m)	Cell altitude (m)	Altitude difference (m)	Precipitation bias (mm)
DU-E	–5.43	56.45	3	70.9	–67.9	41.1
SID02006	10.62	51.8	1142	376.9	765.1	91.5
SID00232	–4.01	40.78	1894	1062.9	831.1	66.7
SID00243	9.35	47.25	2502	743.6	1758.4	147.5



Fig. S1. Locations of 263 sites selected from the ECA data set for ELPIS validation. Four sites from Table S1 are shown in red

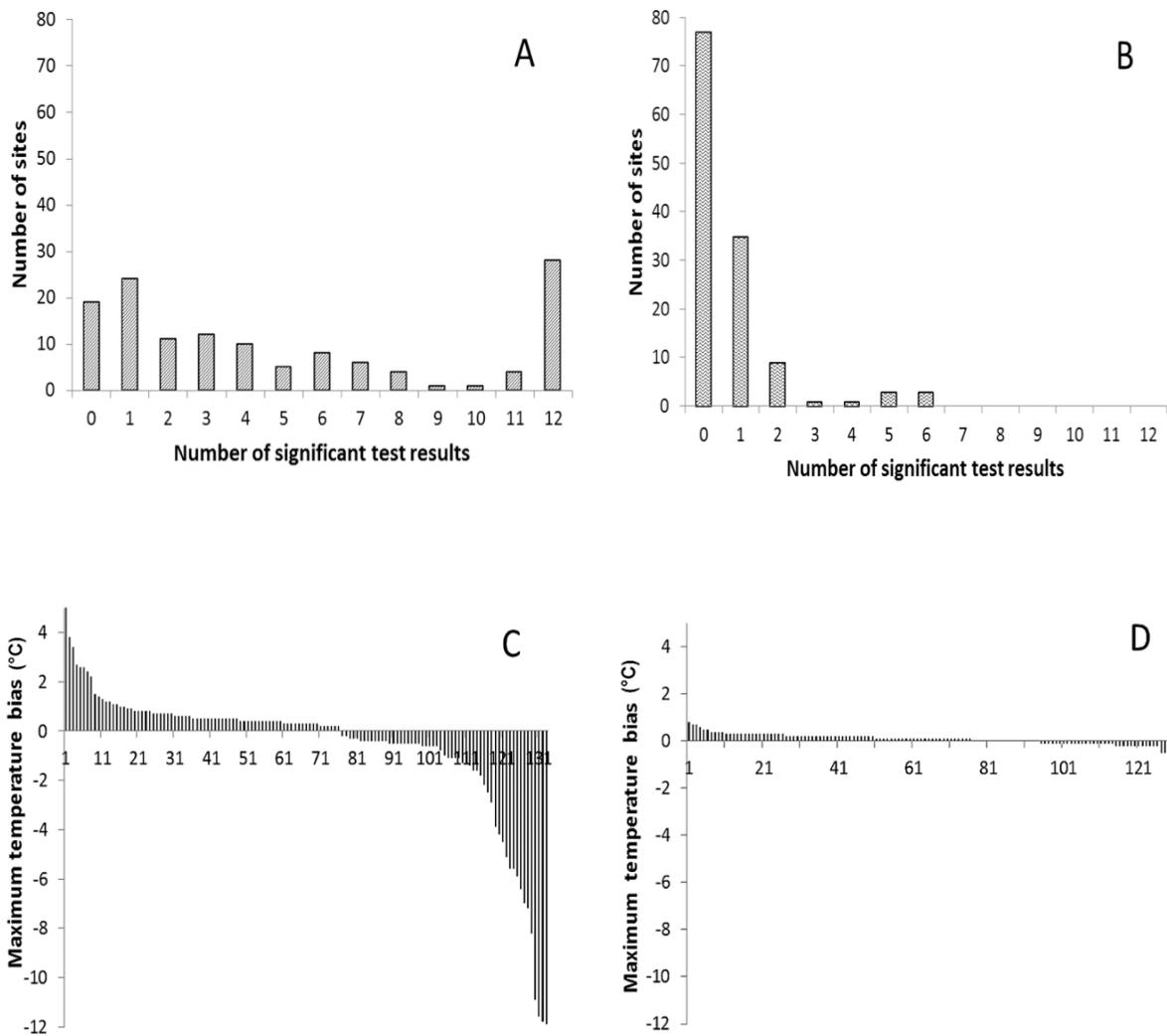


Fig. S2. (A,B) Number of sites with the exact number of significant results for *t*-tests comparing monthly mean maximum temperature for ECA and ELPIS: (A) sites where the test for temperature bias showed significant results; (B) sites where test results for temperature biases were not significant. (C,D) Temperature bias between ECA and ELPIS calculated as average difference in mean monthly temperature: (C) sites where the test for temperature bias showed significant results; (D) sites where test results for temperature bias were not significant

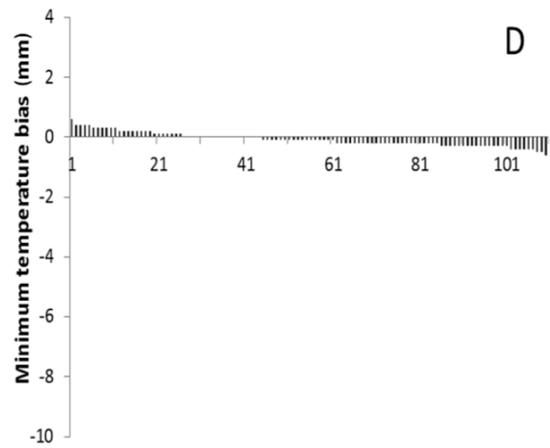
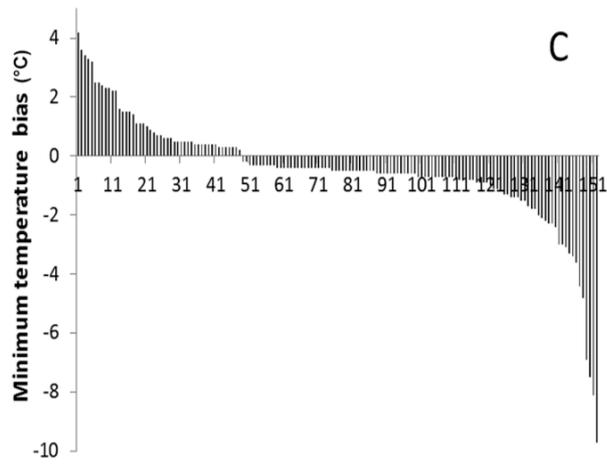
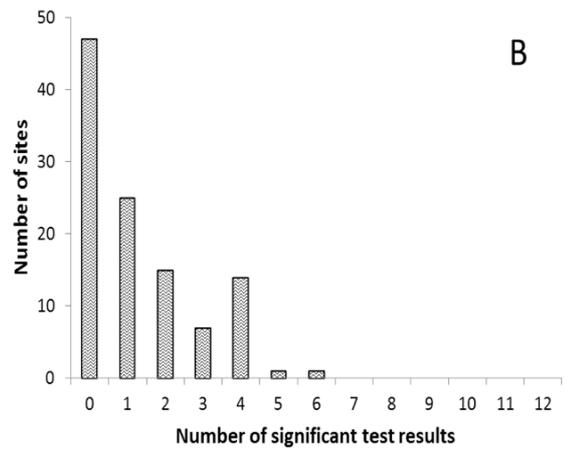
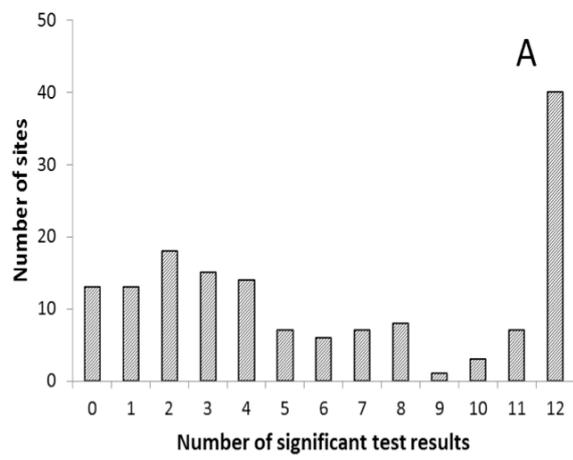


Fig. S3. Details as for Fig. S2, but for minimum temperature

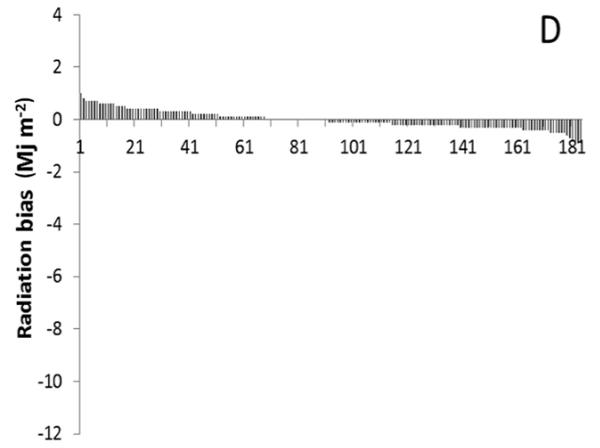
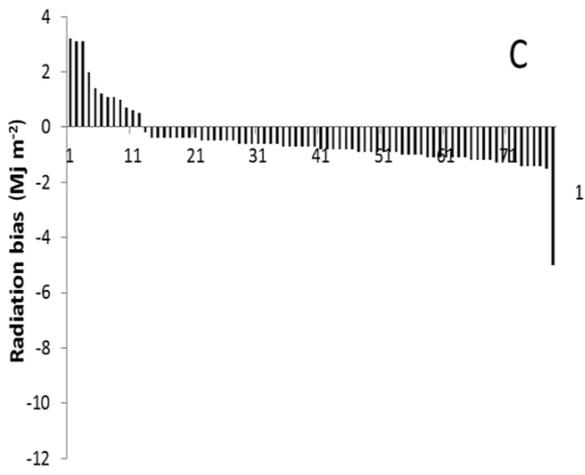
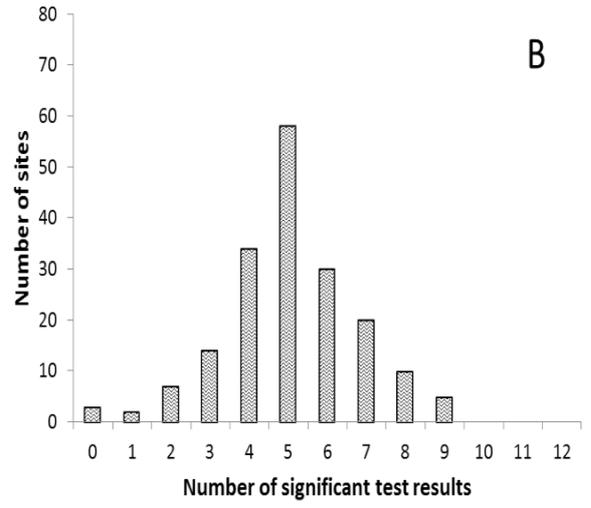
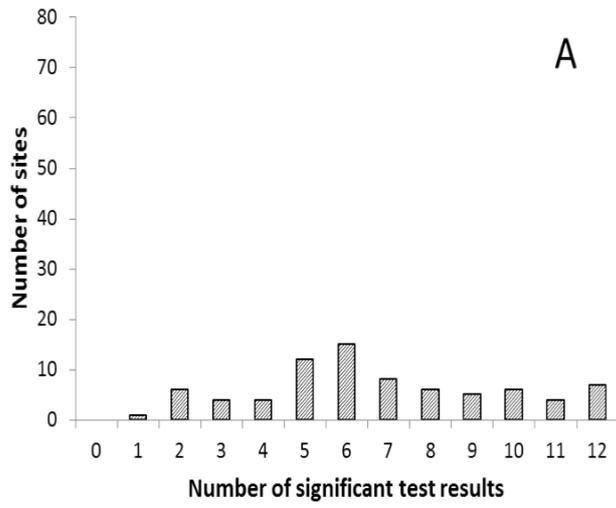


Fig. S4. Details as for Fig. S2, but for solar radiation

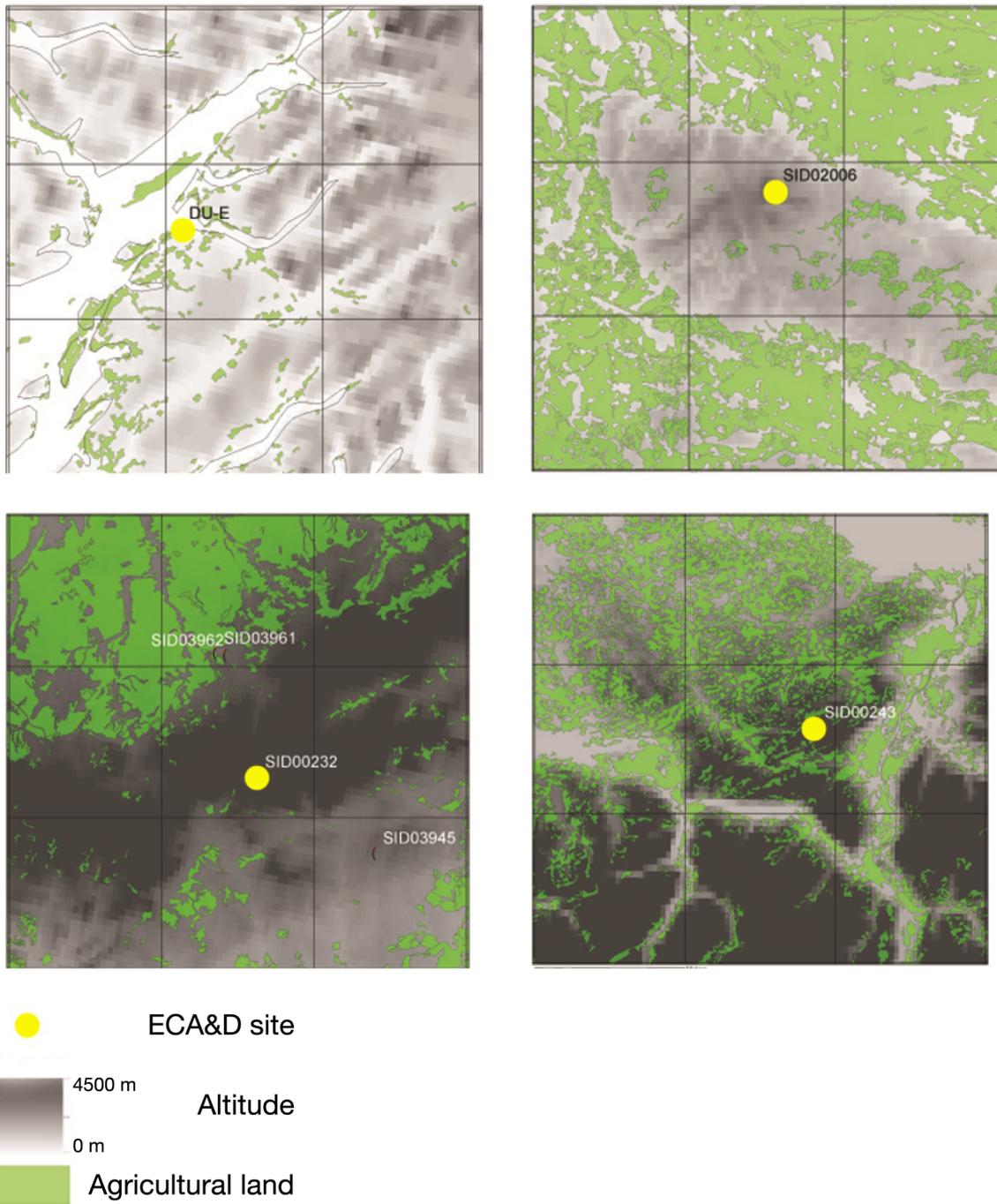


Fig. S5. Locations of 4 ECA sites are shown on the digital elevation map overlaid with the ELPIS grid. Areas in green represent agricultural land. Significant precipitation biases between 41 and 147 mm could be explained by the differences in site and grid-cell altitudes (up to 1758 m) and the proportion of agricultural land within a grid-cell. Site characteristics are presented in Table S1

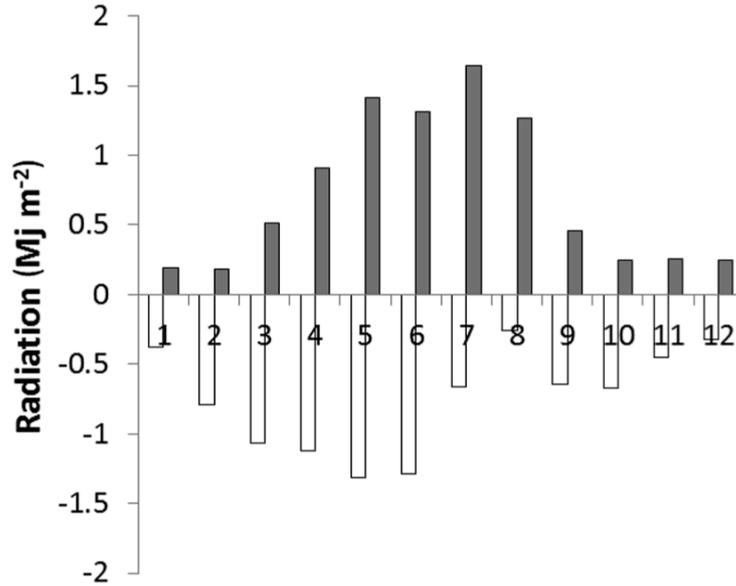


Fig. S6. Differences between monthly means of daily solar radiation estimated by the Rietveld equation (open bars) and by the Supit equations (grey bars) from daily sunshine hours compared with observed solar radiation at site SID00239, Switzerland. When the daily sunshine hours are available, CGMS uses the Ångström-PreScott equation to estimate daily radiation (PreScott 1940):

$$R = R_0 \left( \alpha + \beta \frac{S}{D} \right)$$

where  $R$  is the daily global radiation ( $\text{MJ m}^{-2} \text{d}^{-1}$ ),  $R_0$  is the daily extraterrestrial radiation ( $\text{MJ m}^{-2} \text{d}^{-1}$ ),  $S$  is the daily sunshine duration (h),  $D$  is the astronomical daylength (h), and  $\alpha$  and  $\beta$  are empirical constants. Supit & Van Kappel (1998) estimated empirical constants for the above equations for 256 reference sites where observed daily radiation data were available; these constants were spatially interpolated across Europe using reference sites by a simple distance-weighted-average algorithm. Rietveld used a similar equation, but estimated coefficients  $\alpha$  and  $\beta$  using the following equations:

$$\alpha = 0.1 + 0.24 \frac{S}{D}$$

$$\beta = 0.78 - 0.44 \frac{S}{D}$$