

1 **Martínez-Vilalta, Sala, Asensio, Galiano, Hoch, Palacio, Piper and Lloret. Dynamics of non-**
 2 **structural carbohydrates in terrestrial plants: a global synthesis. *Ecological Monographs*.**

3

4 **APPENDIX S2. Additional tables and figures.**

5

6 TABLE S1. Analysis of variance table for the GLMM models of NSC concentrations (sqrt(mg g⁻¹))
 7 as a function of organ and functional type (FT). A different model was fitted to each NSC
 8 fraction (soluble sugars, starch and total NSC). Conditional and marginal R^2 values are given for
 9 each model. Number of levels for different random factors: Study:Context, 260-357; Study, 77-
 10 97; Species, 117-149.

| Fixed effects | Soluble sugars ($R^2_{\text{cond.}} = 0.89, R^2_{\text{marg.}} = 0.27$) | | | | Starch ($R^2_{\text{cond.}} = 0.84, R^2_{\text{marg.}} = 0.24$) | | | | Total NSC ($R^2_{\text{cond.}} = 0.89, R^2_{\text{marg.}} = 0.22$) | | | |
|---------------|--|----------------|-------------|---------|--|----------------|-------------|---------|---|----------------|-------------|---------|
| | Df | Sum of squares | Mean square | F value | Df | Sum of squares | Mean square | F value | Df | Sum of squares | Mean square | F value |
| Organ | 2 | 135.41 | 67.70 | 81.00 | 2 | 231.08 | 115.54 | 43.85 | 2 | 367.36 | 183.68 | 100.03 |
| FT | 4 | 18.29 | 4.57 | 5.47 | 4 | 91.60 | 22.90 | 8.69 | 4 | 52.49 | 13.12 | 7.15 |
| Organ: FT | 8 | 54.23 | 6.78 | 8.11 | 8 | 169.23 | 21.15 | 8.03 | 8 | 260.06 | 32.59 | 17.70 |

11 Df: degrees of freedom.

12

13

14

15 TABLE S2. Analysis of variance table for the GLMM model of NSC concentrations (sqrt(mg g⁻¹))
 16 as a function of organ and biome. A different model was fitted to each NSC fraction (soluble
 17 sugars, starch and total NSC). Conditional and marginal R^2 values are given for each model.
 18 Number of levels for different random factors: Study:Context, 259-357; Study, 76-97; Species,
 19 114-149.

| Fixed effects | Soluble sugars ($R^2_{\text{cond.}} = 0.89$, $R^2_{\text{marg.}} = 0.24$) | | | | Starch ($R^2_{\text{cond.}} = 0.84$, $R^2_{\text{marg.}} = 0.12$) | | | | Total NSC ($R^2_{\text{cond.}} = 0.89$, $R^2_{\text{marg.}} = 0.17$) | | | |
|-----------------|---|----------------|-------------|---------|---|----------------|-------------|---------|--|----------------|-------------|---------|
| | Df | Sum of squares | Mean square | F value | Df | Sum of squares | Mean square | F value | Df | Sum of squares | Mean square | F value |
| Organ | 2 | 123.59 | 61.80 | 73.70 | 2 | 242.64 | 121.32 | 40.36 | 2 | 375.14 | 187.57 | 86.49 |
| Biome | 3 | 3.74 | 1.25 | 1.49 | 3 | 3.63 | 1.21 | 0.40 | 3 | 2.97 | 0.99 | 0.46 |
| Organ: Biome | 6 | 41.50 | 6.92 | 8.25 | 6 | 119.88 | 19.98 | 6.65 | 6 | 146.95 | 24.49 | 11.29 |

20 Df: degrees of freedom.

21

22

23

24

25

26

27 TABLE S3. Analysis of variance table for the GLMM model of minimum NSC (% of maximum)
 28 as a function of organ and functional type (FT). A different model was fitted to each NSC
 29 fraction (soluble sugars, starch and total NSC). Conditional and marginal R^2 values are given for
 30 each model. Only starch values were square-root transformed to ensure normality. Number of
 31 levels for different random factors: Study:Context, 259-357; Study, 76-97; Species, 114-149.

| Fixed effects | Soluble sugars ($R^2_{\text{cond.}} = 0.56, R^2_{\text{marg.}} = 0.10$) | | | | Starch ($R^2_{\text{cond.}} = 0.63, R^2_{\text{marg.}} = 0.09$) | | | | Total NSC ($R^2_{\text{cond.}} = 0.55, R^2_{\text{marg.}} = 0.04$) | | | |
|---------------|--|----------------|-------------|---------|--|----------------|-------------|---------|---|----------------|-------------|---------|
| | Df | Sum of squares | Mean square | F value | Df | Sum of squares | Mean square | F value | Df | Sum of squares | Mean square | F value |
| Organ | 2 | 3099.8 | 1549.9 | 7.159 | 2 | 22.38 | 11.188 | 4.987 | 2 | 947.4 | 473.70 | 2.26 |
| FT | 4 | 2243.9 | 561.0 | 2.591 | 4 | 14.44 | 3.610 | 1.610 | 4 | 1797.5 | 449.37 | 2.14 |
| Organ: FT | 8 | 2696.2 | 337.0 | 1.557 | 8 | 37.03 | 4.628 | 2.063 | 8 | 1834.8 | 229.35 | 1.09 |

32 Df: degrees of freedom.

33

34

35

36

37

38

39 TABLE S4. Analysis of variance table for the GLMM model of minimum NSC (% of maximum)
 40 as a function of organ and biome. A different model was fitted to each NSC fraction (soluble
 41 sugars, starch and total NSC). Conditional and marginal R^2 values are given for each model.
 42 Only starch values were square-root transformed to ensure normality. Number of levels for
 43 different random factors: Study:Context, 259-357; Study, 76-97; Species, 114-149.

| Fixed effects | Soluble sugars ($R^2_{\text{cond.}} = 0.56, R^2_{\text{marg.}} = 0.06$) | | | | Starch ($R^2_{\text{cond.}} = 0.63, R^2_{\text{marg.}} = 0.10$) | | | | Total NSC ($R^2_{\text{cond.}} = 0.55, R^2_{\text{marg.}} = 0.01$) | | | |
|-----------------|--|----------------|-------------|---------|--|----------------|-------------|---------|---|----------------|-------------|---------|
| | Df | Sum of squares | Mean square | F value | Df | Sum of squares | Mean square | F value | Df | Sum of squares | Mean square | F value |
| Organ | 2 | 3005.48 | 1502.74 | 6.96 | 2 | 23.361 | 11.681 | 5.021 | 2 | 845.27 | 422.64 | 2.030 |
| Biome | 3 | 296.33 | 98.78 | 0.46 | 3 | 21.530 | 7.177 | 3.085 | 3 | 61.83 | 20.61 | 0.099 |
| Organ: Biome | 6 | 2746.65 | 457.78 | 2.12 | 6 | 21.368 | 3.561 | 1.531 | 6 | 538.07 | 89.68 | 0.430 |

44 Df: degrees of freedom.

45

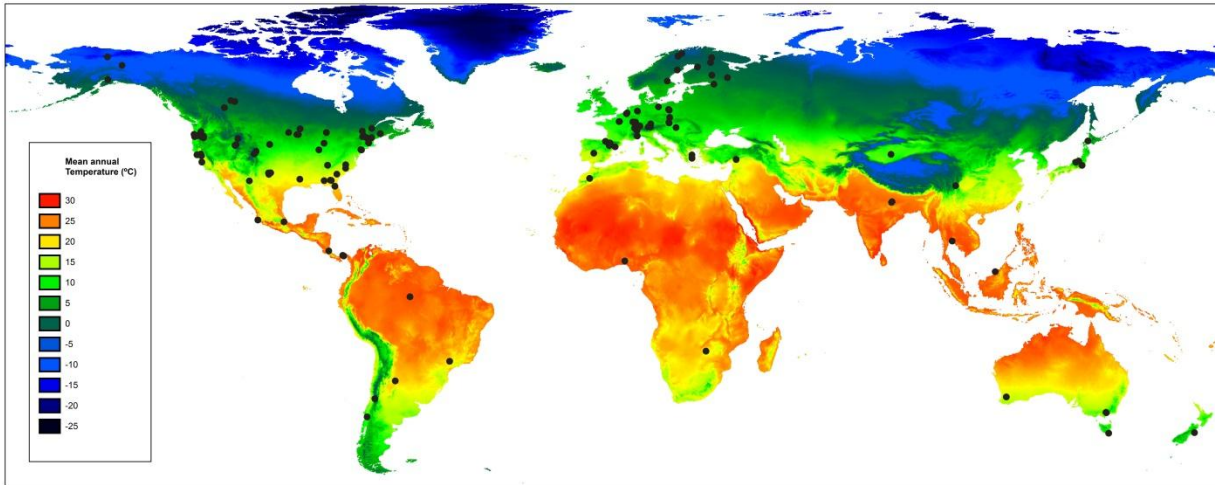
46

47

48

49

50

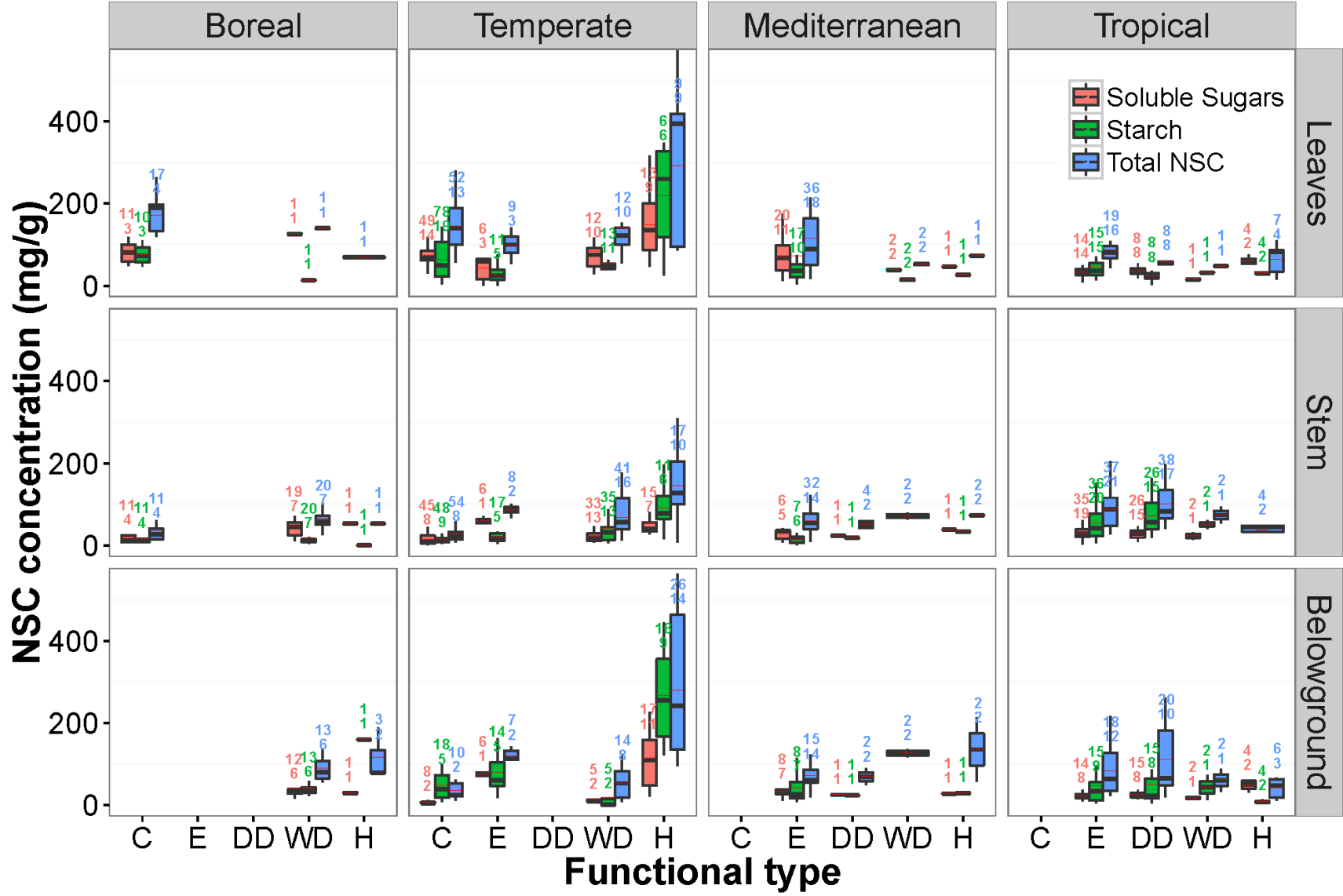


51

52 FIG. S1. Map of the World showing average annual temperatures and the sampling locations of all the
53 studies included in our final NSC database.

54

55



57 FIG. S2. Box and whiskers plot of NSC concentrations as a function of biome, functional type, organ and fraction (soluble sugars, starch and total
58 NSC). Thick horizontal bars (black) show the median, whereas red dashed lines indicate the mean. The upper and lower "hinges" correspond to the
59 first and third quartiles (the 25th and 75th percentiles), and whiskers extend from the hinge to the highest (or lowest) value that is within $1.5 * IQR$
60 of the hinge. All these statistics are computed across species by context combinations (context corresponds to different combinations of study, site
61 and specific measurement conditions; see text). Numbers on top of boxes indicate the number of context combinations (upper figure) and species
62 (lower figure) represented in each case.

63

64

65

66

67

68

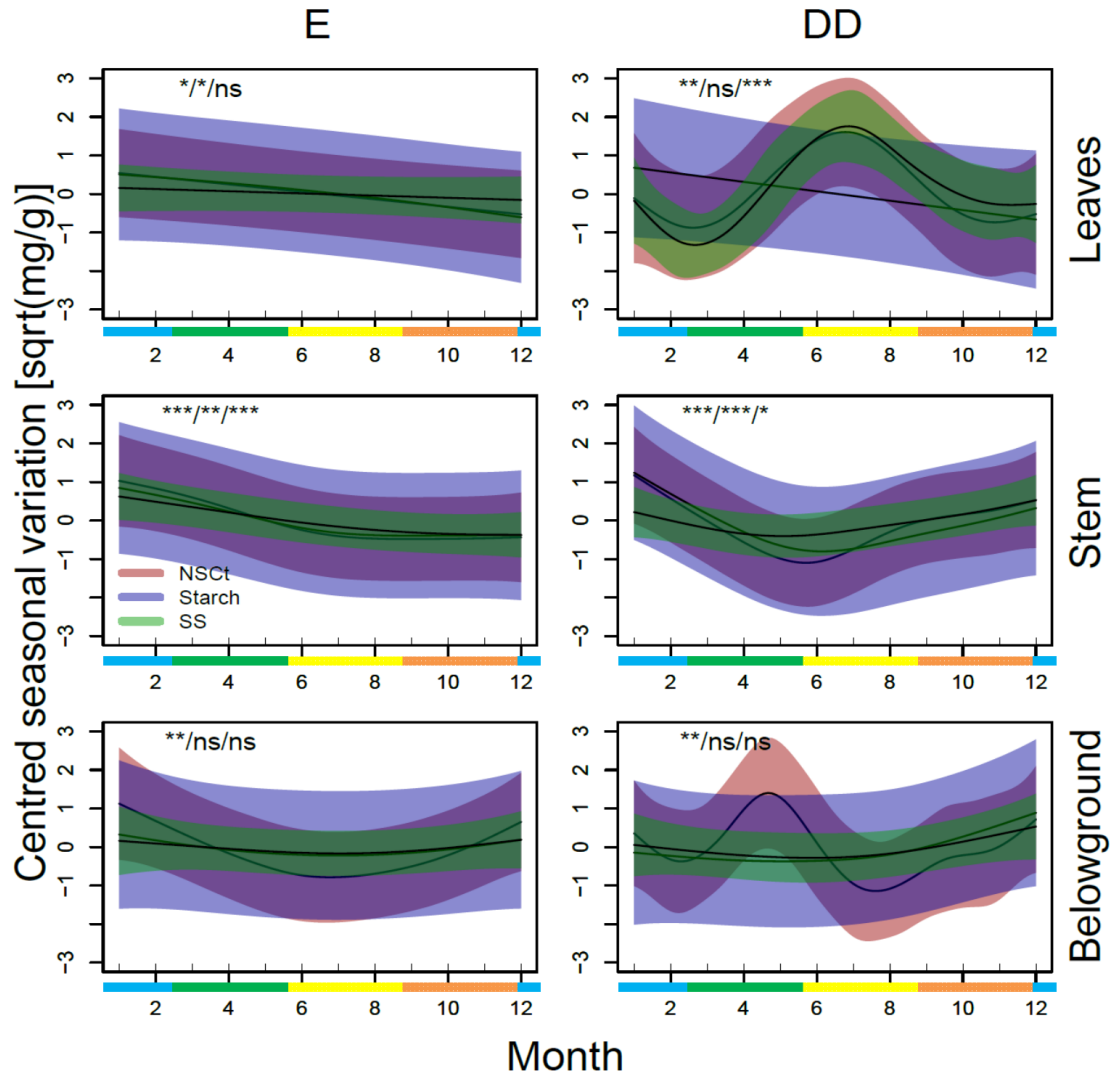
69

70

71

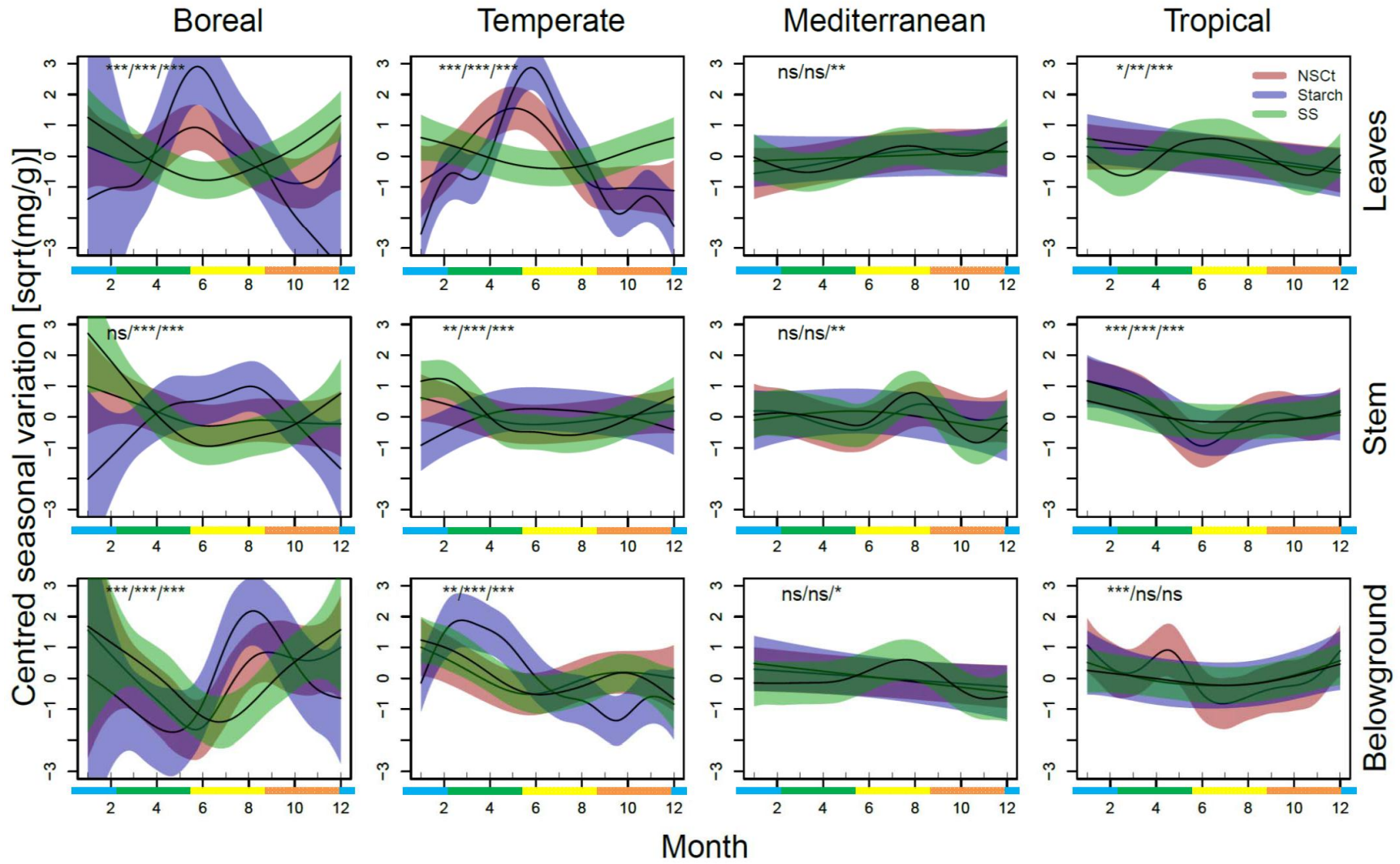
72

73



74

75 FIG. S3. Seasonal variation (centered smooths) of NSC concentrations as a function of month for tropical
 76 evergreen (E, left column) and drought deciduous (DD, right column) species, according to the fitted
 77 GAMM models (see text). Three NSC fractions (total NSC, starch, soluble sugars (SS)) are shown in each
 78 panel. Shaded areas around the contour plot for each estimate correspond to ± 1 SE. In each panel,
 79 asterisks indicate that the smooth term is significant (at $P < 0.05$ (*), $P < 0.01$ (**), or $P < 0.001$ (***) for
 80 NSC_T / Starch / SS, in this order). Seasons are indicated by a colored bar in the x axis of each panel: blue,
 81 winter; green, spring; yellow; summer; orange, autumn. For Southern hemisphere data the month of the
 82 year was changed to match the seasons in the Northern hemisphere.



84 FIG. S4. Seasonal variation (centered smooths) of NSC concentrations as a function of month for different biome (columns) and organ (rows)
85 combinations, according to the fitted GAMM models (see text) and considering woody species. Three NSC fractions (total NSC, starch, soluble
86 sugars (SS)) are shown in each panel. Shaded areas around the contour plot for each estimate correspond to ± 1 SE. In each panel, asterisks
87 indicate that the smooth term is significant (at $P < 0.05$ (*), $P < 0.01$ (**), or $P < 0.001$ (***) for NSC_T / Starch / SS, in this order). Seasons are
88 indicated by a colored bar in the x axis of each panel: blue, winter; green, spring; yellow; summer; orange, autumn. For Southern hemisphere data
89 the month of the year was changed to match the seasons in the Northern hemisphere.

