Ecography

E7799
Lindström, Å., Green, M., Paulson, G., Smith, H. G. and Devictor, V. 2012. Rapid changes in bird community composition at multiple temporal and spatial scales in response to recent climate change. – Ecography 35: xxx–xxx.

Supplementary material

Supplementary information: **correlation between STI values calculated with different sources of data (Lindström et al.)**

The CTI (Community Temperature Index) of a given assemblage is the average of species' STI (Species Temperature Index) occurring in this assemblage weighted by species abundance. An increase in CTI reflects the rate of replacement of individuals belonging to species with low STI by those with higher STI. When calculated using presence-absence data, CTI is simply the average of species' STI. In this case, the rate of change in CTI reflects the rate of replacement of species (not individuals) with low STI by those with higher STI. Thus, changes in CTI (either calculated with abundance or presence-absence) reflect how community composition is changing with respect to species' STI.

Therefore, to estimate the rate of change in CTI, one is more interested in the relative order of species along the STI gradient than in each species-specific STI value. In other words, the CTI calculated in a given place is less informative than its changes. In fact, STI can be calculated from different sources of data as soon as it allows the ordering of species from those dependent on low temperature to those dependent on hotter temperature. To illustrate this issue, we have tested the correlations between STI calculated with different sources of data.

Robustness of STI to changes in the area and datset considered

Monitoring_STI is calculated using the distribution of birds in Sweden estimated from the Swedish breeding bird survey

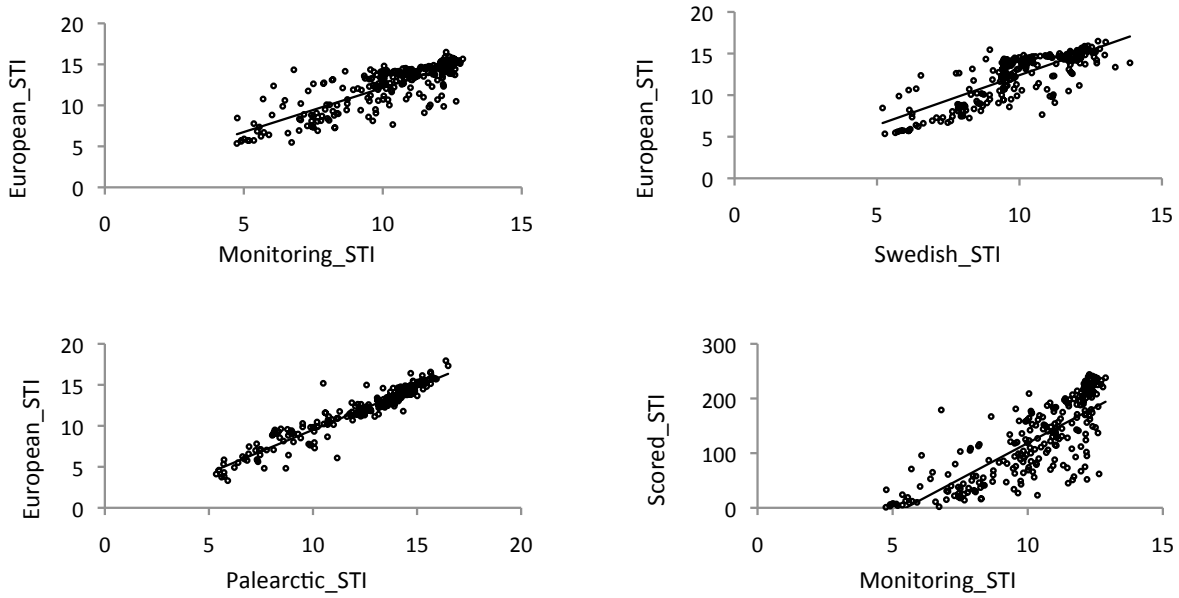
Swedish_STI is calculated using the distribution of birds in Sweden according to the European Atlas of Hagemeijer and Blair (1997)

European_STI is calculated using the entire species distribution according to the European Atlas of Hagemeijer and Blair (1997)

Scored_STI is calculated by sorting the species according to their European_STI and by attributing an increasing score to the species from 1 to 244.

Palearctic_STI is calculated using the Palearctic distribution of birds of Barbet-Massin et al. (2010).

Note that each of these STI (all calculated using April-August temperature) capture different ranges of temperature, land-mass, extent of the total species distribution etc. Some of these STIs are also estimated using very different sources of data (e.g. Monitoring data versus European atlas). The following graphs and table of correlations however show that they each provide similar distribution of species along the STI gradient. In other words, "hot-species" and "cold-species" are more or less the same, whatever the STI considered.

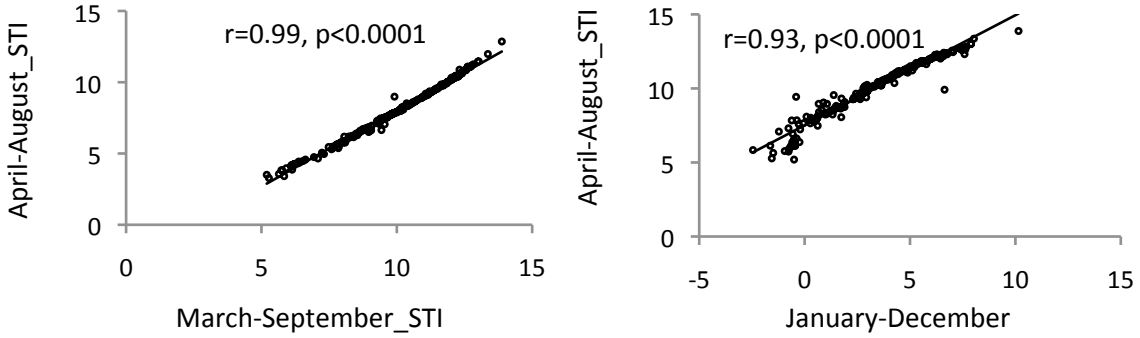


	Monitoring_STI	Swedish_STI	European_STI	Scored_STI	Palearctic_STI
Monitoring_STI	1				
Swedish_STI	0.93	1			
European_STI	0.82	0.78	1		
Scored_STI	0.78	0.78	0.95	1	
Palearctic_STI	0.81	0.78	0.96	0.91	1

Table S1. This table provides correlation coefficients between all pairs of STI gradient calculated for the 244 species using different sources of data. All correlations are highly significant ($p<0.0001$)

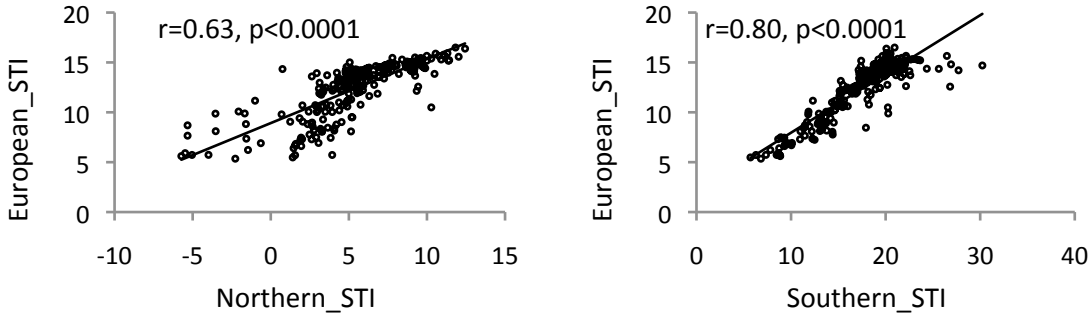
Robustness of STI to changes in the time-window considered

STI are calculated using temperature of the average breeding season of most species (April to August). However, species have different phenologies. Hence, while STI calculated using April to August temperature may be accurate for some species, other species might have more relevant STIs if calculated using a different time window, better adapted to their own phenology. However, here again, changing this species-specific information will not alter substantially how species are classified among each other along a STI gradient. For instance, March-September, and even January-December STI are all highly correlated as illustrated beow.



Robustness of STI to the subset of the species range considered

Finally, STI can also be estimated by focusing on a particular subset of the species' ranges. For instance, it is likely that northern parts of species ranges are delineated by populations more locally adapted to colder temperature. Therefore, rather than using STI calculated as the average of temperature over the species distribution, one can calculate STI for the northern part of the distribution only. This, however, will not alter the overall ranking of species according to their STI. For instance species' STI (April-August) calculated using the 5% of the coldest or the hottest European atlas cells are highly correlated to their STI calculated using the whole distribution:



Barbet-Massin, M., Thuiller, W., Jiguet, F. How much do we overestimate future local extinction rates when restricting the range of occurrence data in climate suitability models? *Ecography* **33**, 878-886 (2010).

Hagemeijer, W. J. M. & Blair, M. J. The EBCC atlas of European breeding birds: their distribution and abundance. London, UK: T. & A. D. Poyser (1997).