

Wu, J., Y. Kurosaki, T. T. Sekiyama, T. Maki, 2023: Effects of dry vegetation coverage estimated from the MODIS Soil Tillage Index on dust occurrence: Verification by surface synoptic observations. *J. Meteor. Soc. Japan*, **101**, 67-77.
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Plain Language Summary: Dry vegetation is a crucial parameter in determining dust occurrence through its effect on the threshold wind speed, which is the minimum wind speed required to initiate dust occurrence. This study proposed a method to obtain the threshold wind speed that accounts for the changes in dry vegetation coverage estimated from the MODIS Soil Tillage Index (STI). We evaluated the impact of dry vegetation coverage on dust occurrence in the Gobi Desert and surrounding regions in March and April during 2001–2021. The results show that the accuracy of dust prediction was significantly improved in April by using the estimated threshold wind speed, while other factors in addition to dry vegetation should be considered in March. The findings imply that the estimation of dry vegetation coverage should be applied to dust models to improve the dust prediction accuracy.

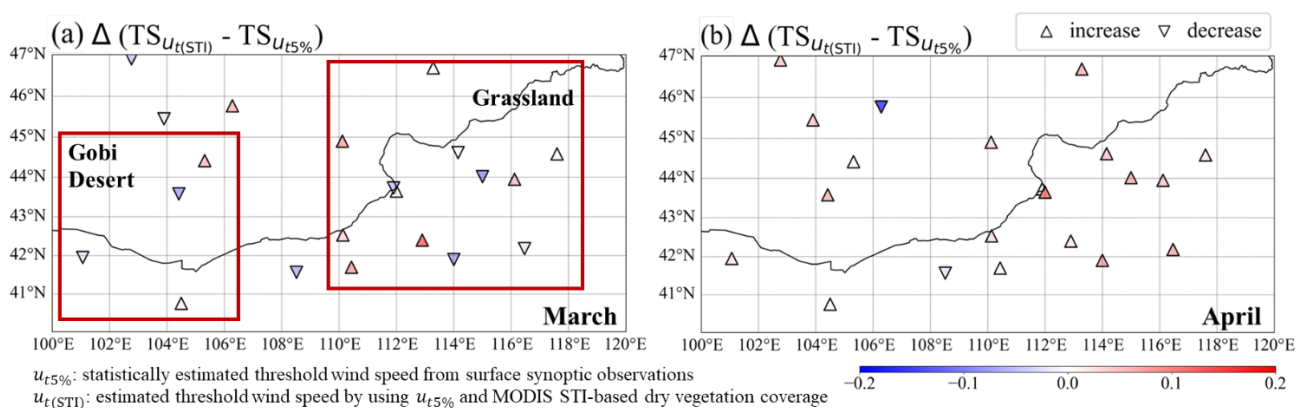


Figure 1. Spatial distributions of increases and decreases between threat scores $TS_{u_{t5\%}}$ and $TS_{u_{t(STI)}}$ for dust occurrence in (a) March and (b) April at the SYNOP observatories in our study area. Increases and decreases are shown by triangles and inverted triangles, respectively, and the color indicates the magnitude of the change.

- A new method to obtain the threshold wind speed that takes account of the interannual variations of dry vegetation coverage is proposed.
- Dry vegetation coverage is a key factor determining interannual variations in the April dust occurrence.
- Other land surface factors such as soil freeze–thaw and snow cover should be considered to explain dust occurrence variations in March.