EGU23-7750, updated on 20 Apr 2024
https://doi.org/10.5194/egusphere-egu23-7750
EGU General Assembly 2023

Probabilistic predictions of global fire activity

Miguel Ángel Torres-Vázquez, Andrina Gincheva-Norcheva, Amar Halifa-Marín, Juan Pedro Montavez, and Marco Turco
University of Murcia, Faculty of Chemistry, Physics, Murcia, Spain (miguelangel.torres@um.es)

Seasonal forecasts of meteorological drought can help decision-making for weather-driven wildfires (Turco et al., 2018). However, one of the main drawbacks of drought prediction lies in the uncertainty of monitoring precipitation in near-real time. In this contribution we assess the predictability of the Standardized Precipitation Index (SPI) on a global scale, combining 11 datasets (DROP; Turco et al., 2020) as observed initial conditions with empirical and dynamic predictions of precipitation. The empirical predictions are based on the ensemble-based streamflow prediction system (ESP, an ensemble-based reordering of historical data) and the dynamics on the new generation seasonal prediction model developed by ECMWF (System 5; S5). Although both systems show comparable quality, S5 performs better at longer forecast timescales, especially over tropical regions.

Subsequently, we investigate whether the S5 seasonal forecasts can predict area burned anomalies on a global scale. To do so, we link the seasonal climate predictions of S5 to an empirical climate-fire model, using standard regression techniques in the framework of generalised linear models. The seasonal climate predictions of S5 have shown high and significant performance (with a mean relative operating characteristic “ROC” area value of 0.87) over a large fraction of the burnable area (~47%).

In summary, given that all data are publicy available in near real time, our results provide a basis for the development of a global probabilistic seasonal drought and burned area forecast product.

References

Turco, M., Jerez, S., Doblas-Reyes, F. J., AghaKouchak, A., Llasat, M. C., & Provenzale, A. (2018). Skilful forecasting of global fire activity using seasonal climate predictions. *Nature Communications*, *9*(1), 1–9.

Turco, M., Jerez, S., Donat, M. G., Toreti, A., Vicente-Serrano, S. M., & Doblas-Reyes, F. J. (2020). A global probabilistic dataset for monitoring meteorological droughts. *Bulletin of the American Meteorological Society*, *101*(10), E1628–E1644.

Acknowledgements

We acknowledge funding through the project ONFIRE, grant PID2021-123193OB-I00,funded by

MCIN/AEI/ 10.13039/501100011033.