

Potential use of ECMWF SEAS5 ensemble prediction system in streamflow and rice yield forecasting for Mainland Southeast Asia

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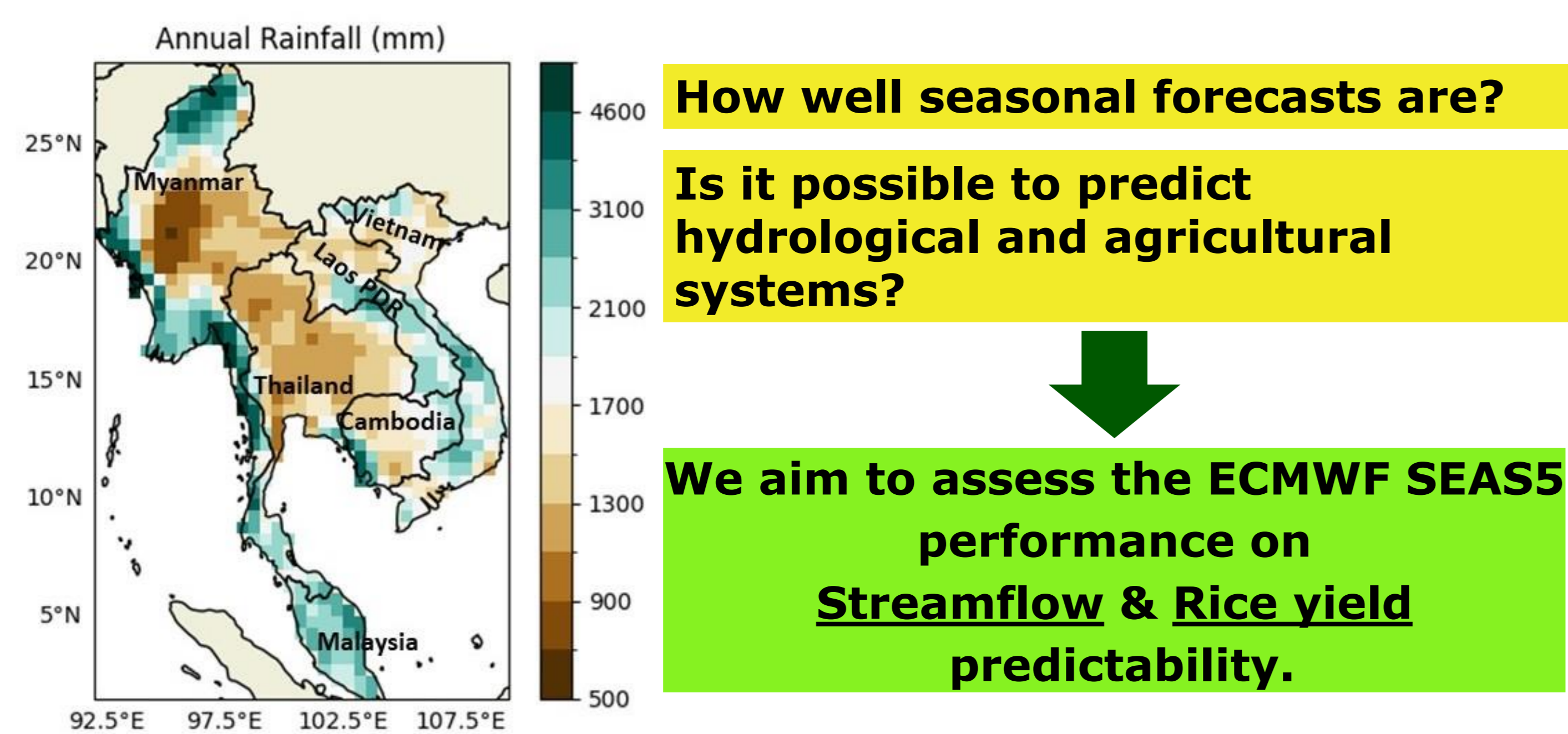
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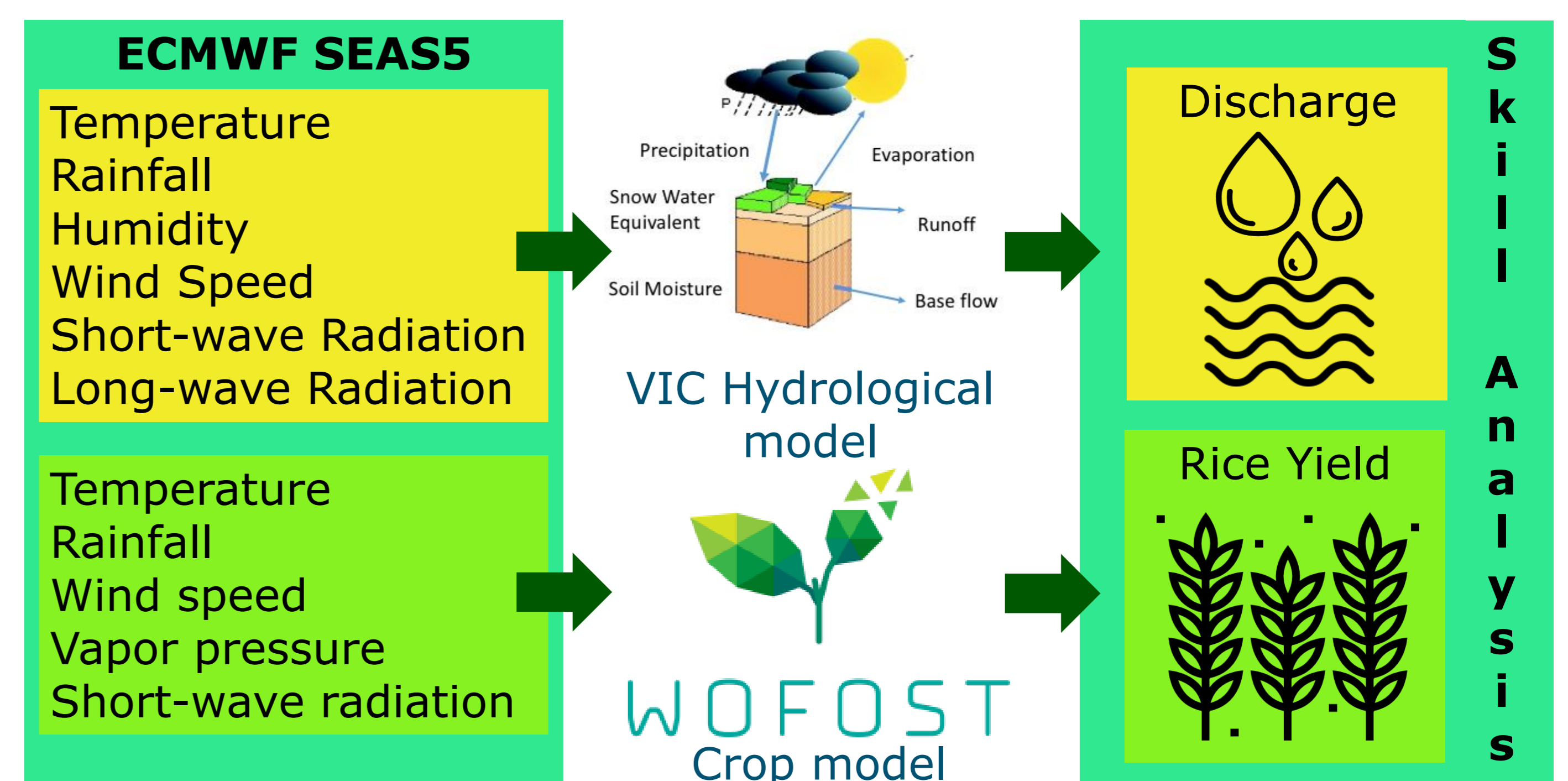
Background & Objectives

- Mainland Southeast Asia (MSEA) is vulnerable to climate change.
- Reliable forecasts for early warning systems are necessary.



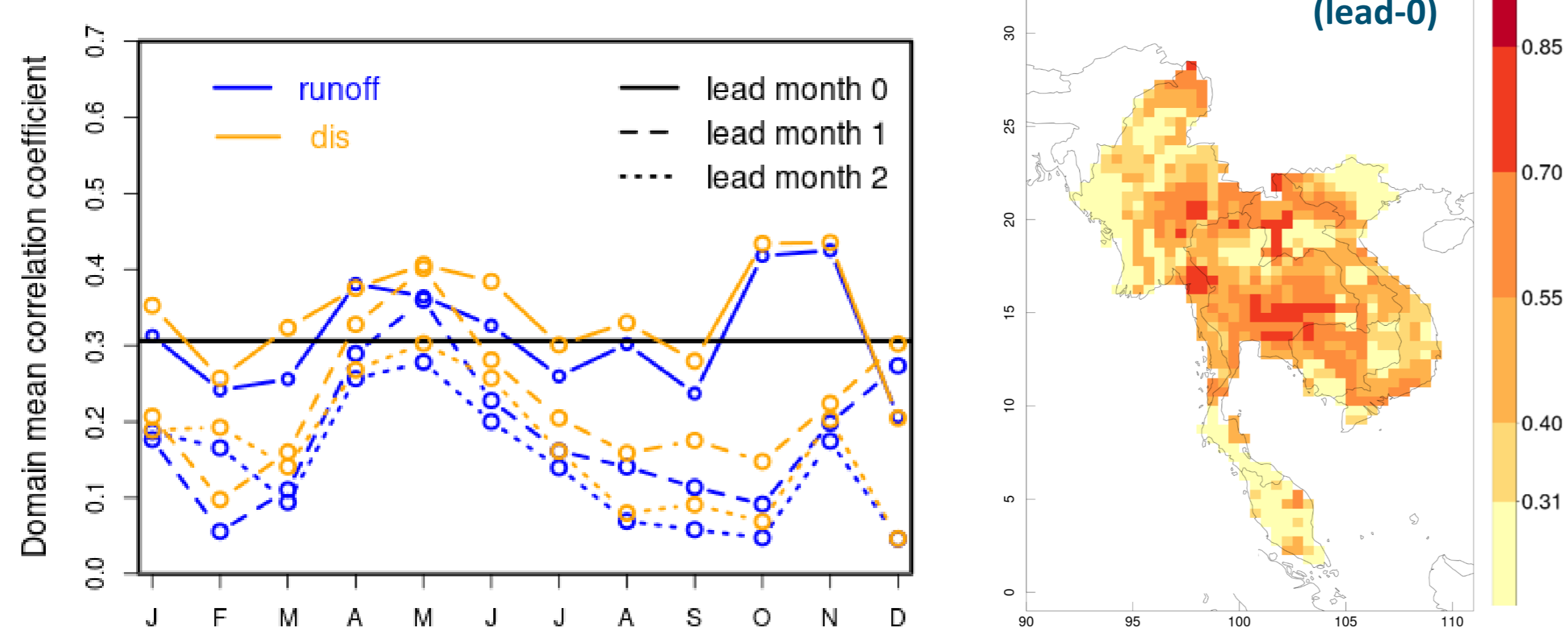
Methods

- We used hindcasts to examine the SEAS5 performance over MSEA during 1985-2014.



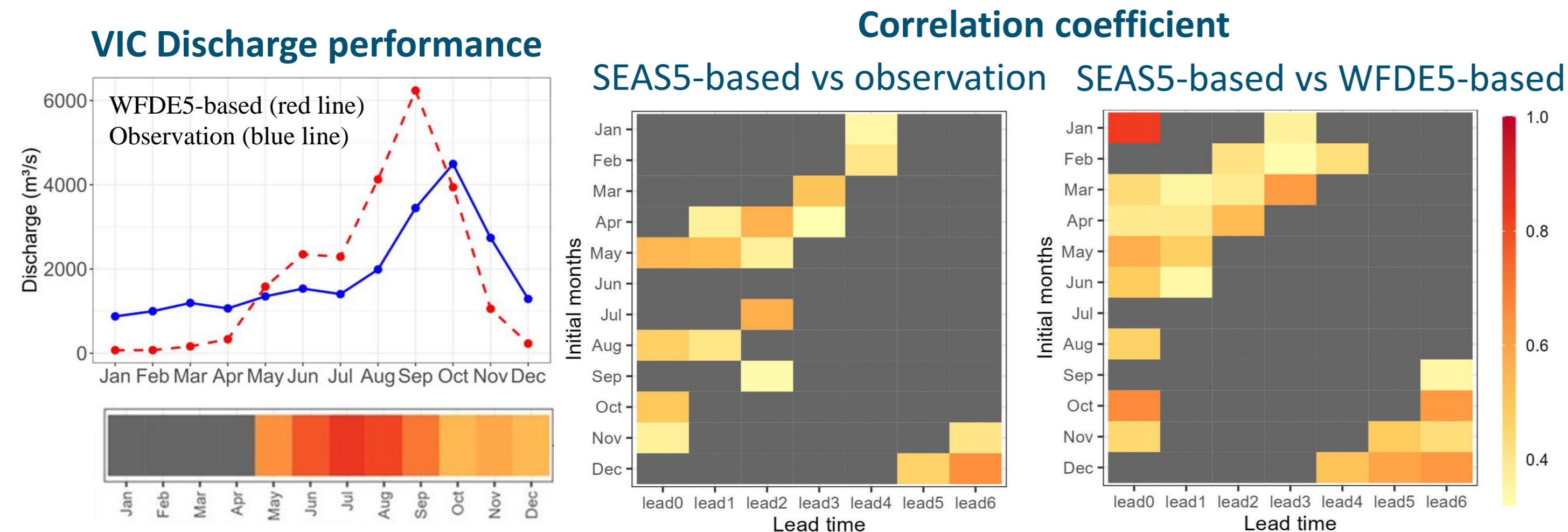
Results

Hydrological forecasting skill



- Prediction is slightly better for discharge than for runoff.
- Discharge accumulates river flow from upstream to downstream that aggregates the skill.

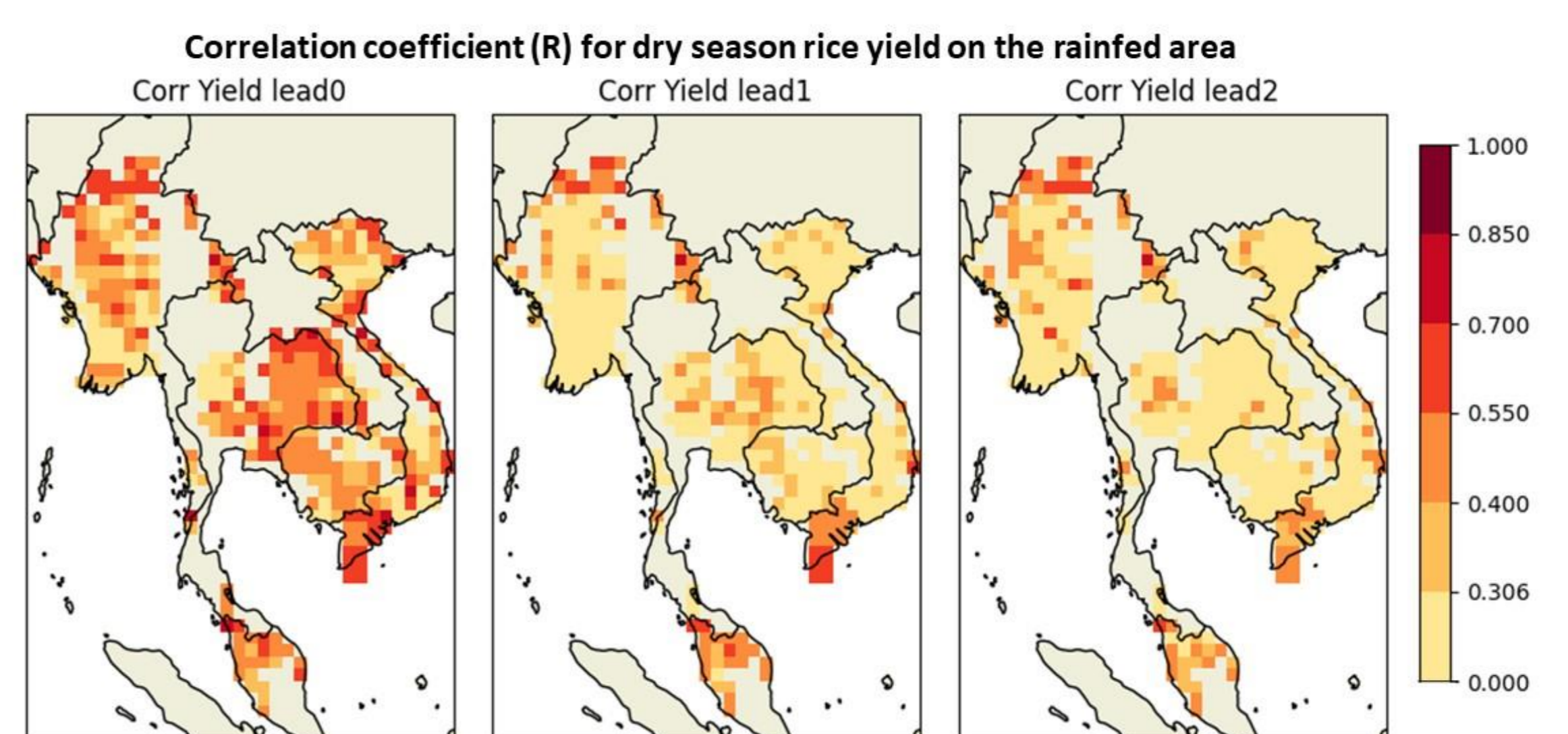
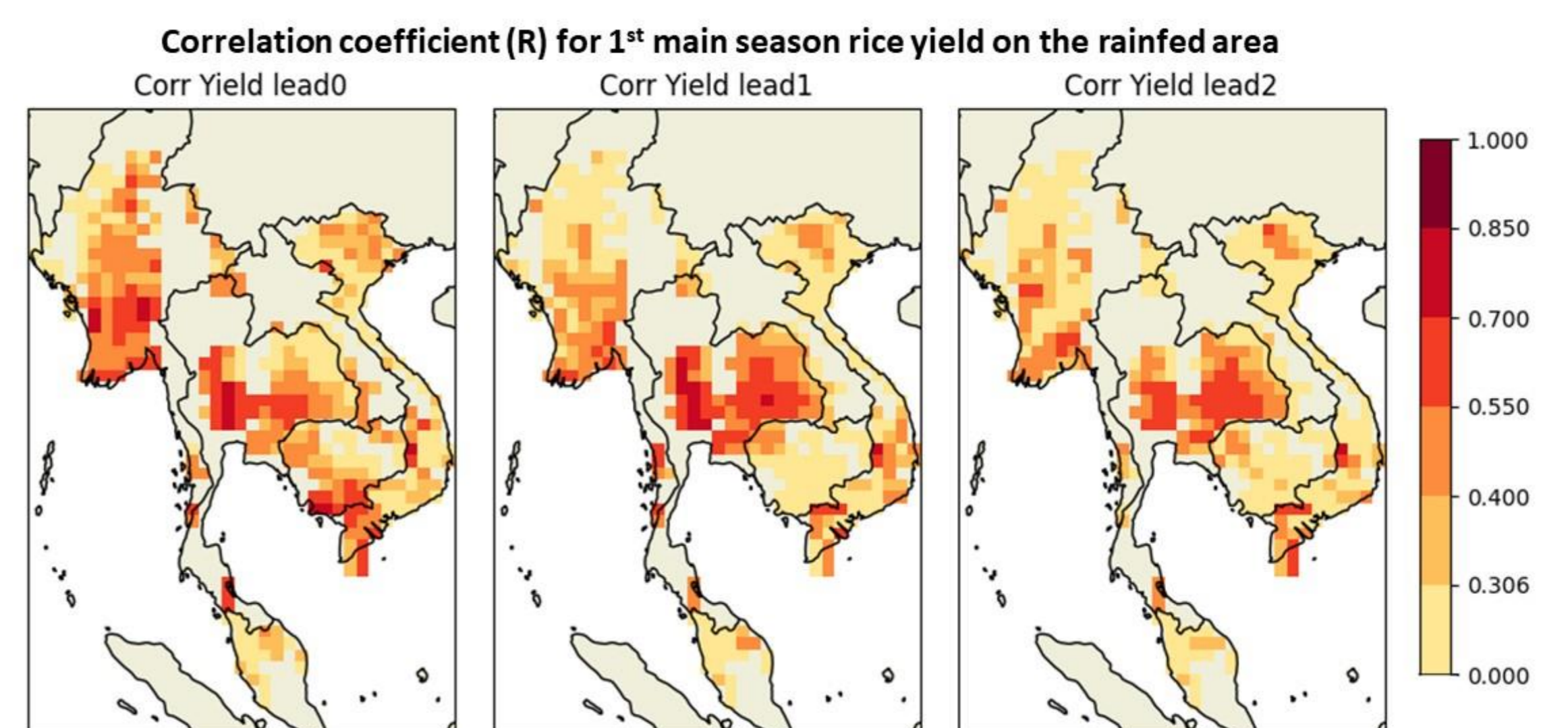
Station C.2, Chao Phraya River, Latitude: 15.67, Longitude: 100.11



- Discharge skill is lower when compared with observation; however, it shows a persistence of skill through a large number of lead months.

Rice yield forecasting skill

	Emergence date	
	Main season	Dry season
Cambodia	05-Jun	05-Nov
Lao PDR	05-Jun	05-Dec
Peninsular Malaysia	05-Aug	05-Mar
Myanmar	05-May	05-Nov
Thailand	05-May	05-Jan
Vietnam	05-Mar	05-Dec



- Performance in predicting rice yield varies based on the target forecasting month.
- The model shows high accuracy with 1-month lead time, but its predictive skill decreases as the lead time increases.
- Regional differences in SEAS5's predictive capability.

Conclusions

• In combination with the VIC model, SEAS5 can be effectively used for hydrological forecasting. Additionally, when combined with the WOFOST crop model, it is also effective for rice forecasting.

• Effective planning and management of hydrological and agricultural practices are essential to mitigate potential risks.

References

Wanthanaporn U., Supit I., Chaowiwat W. and Hutjes R.W.A. (2024). Skill of rice yields forecasting over Mainland Southeast Asia using the ECMWF SEAS5 ensemble prediction system and the WOFOST crop model. *Agricultural and Forest Meteorology*, 315. <https://doi.org/10.1016/j.agrformet.2024.110001>