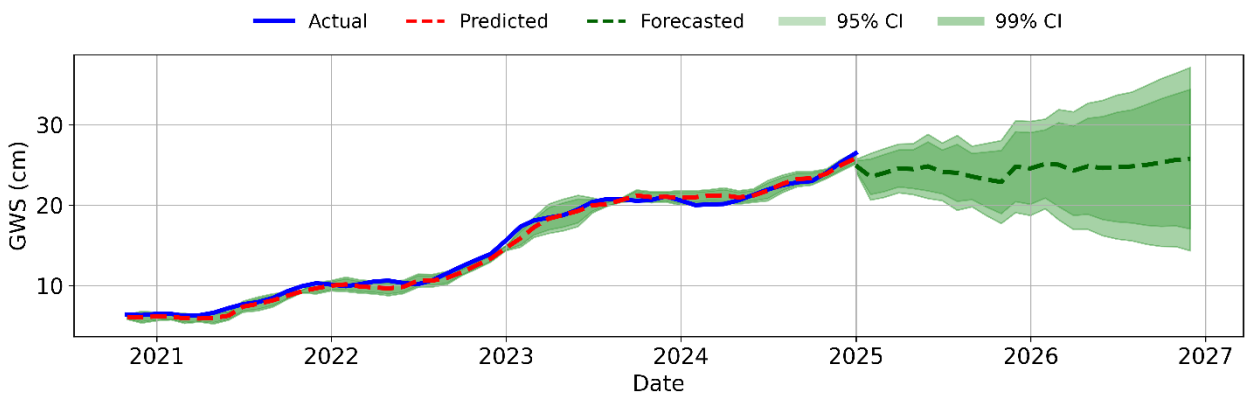
Supplemntary materials

Table S1. Hyper Parameters of the BiLSTM model used for forecasting groundwater storage change

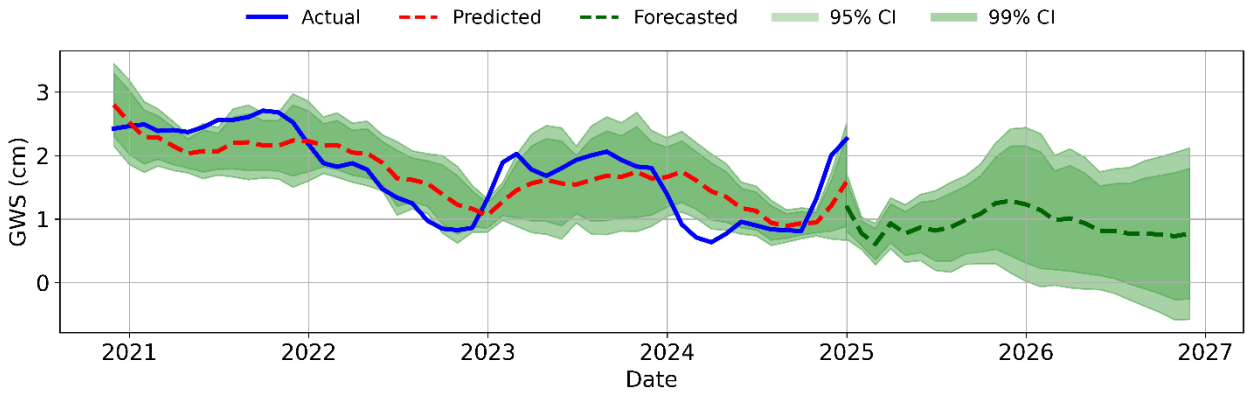
Hyperparameter	**Search Range**	**Final Selected Value**
Number of BiLSTM units	32 – 256	150
Dense layer size	16 – 128	75
Learning rate	0.00001 – 0.001	0.0001
Batch size	16 – 64	32
Dropout rate	0.1 – 0.5	0.2
Number of epochs	20 – 100 (with early stopping)	Varied with the station
Optimizer	Adam	Adam
Activation function	ReLU, tanh	ReLU

Figure S1. Forecasting results

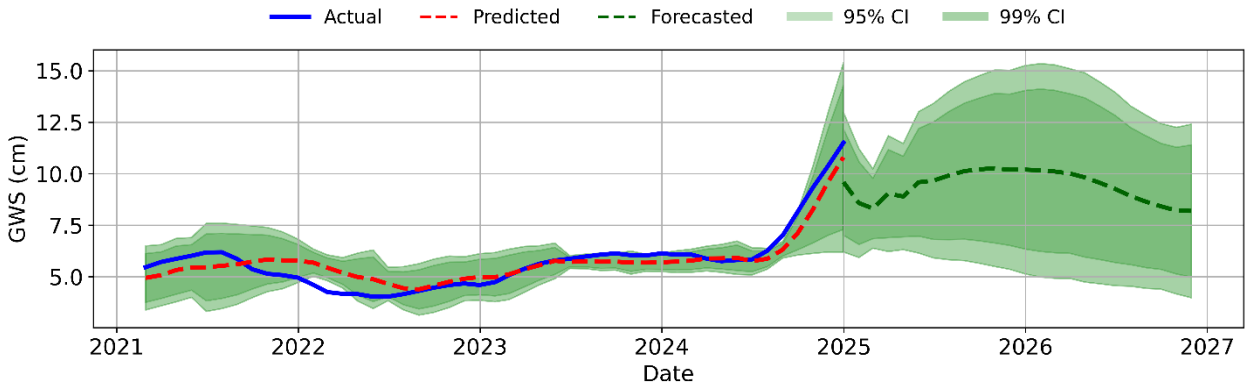
Blue Nile



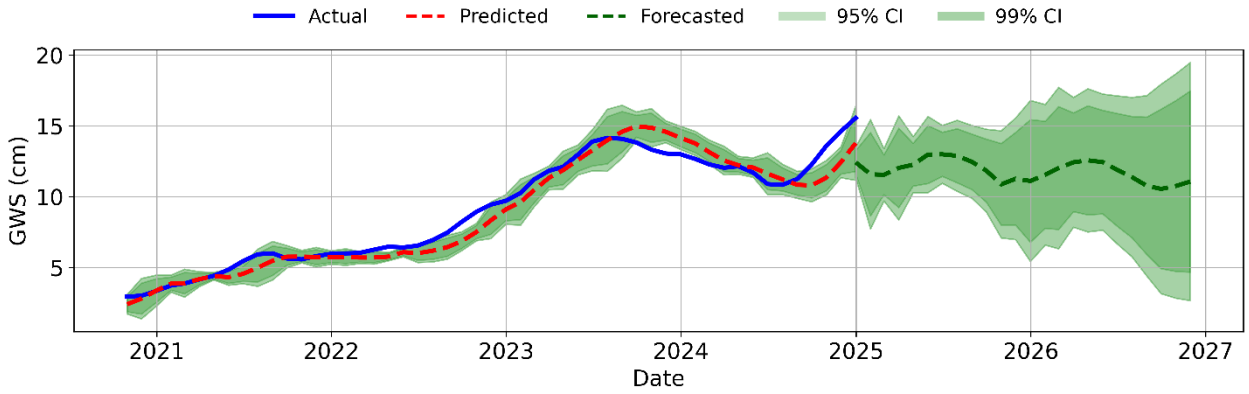
Khartoum



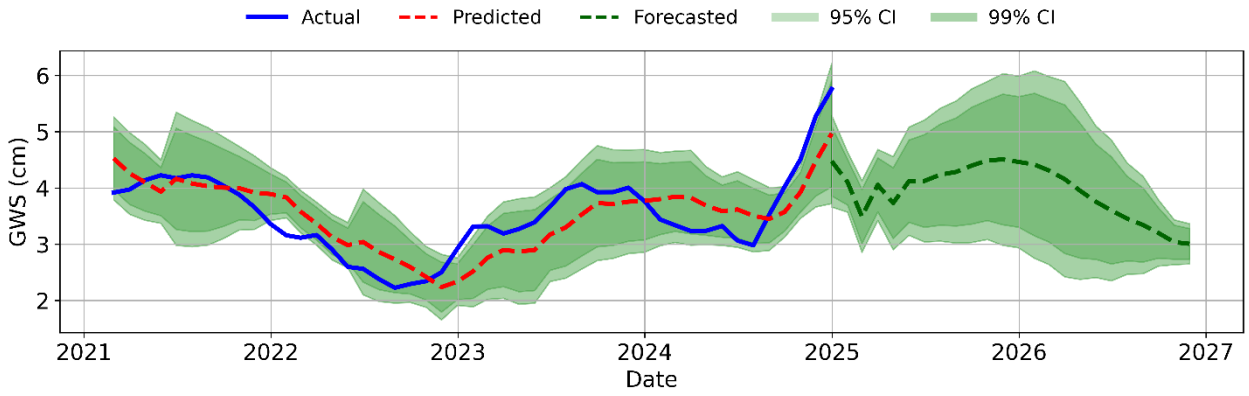
North Darfur



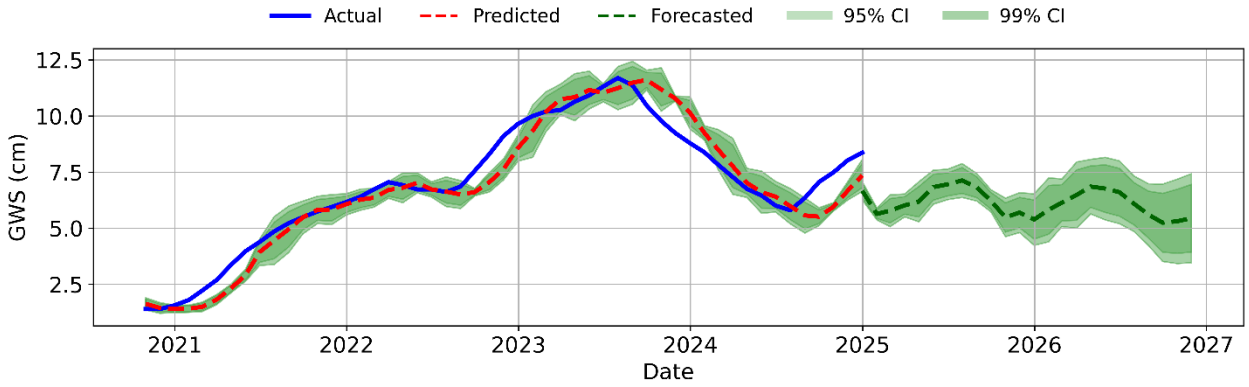
South Darfur



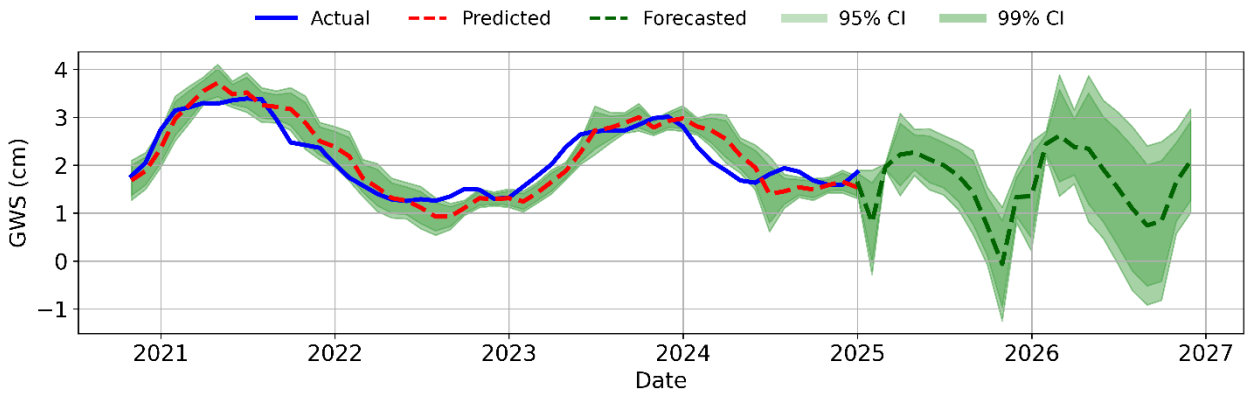
North Kordofan



South Kordofan



Red Sea



Northern State

