Predicting future phenological changes in Iraq using climate change scenarios

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Accelerated climate change exerts great pressure on the environment and livelihoods of people, particularly in the Middle East, which is prone to droughts and crop failures. Iraq, especially, is experiencing serious socioeconomic and ecological problems due to the changing climate. It is, therefore, very important to analyze and predict phenological changes as this data will enable policymakers and NGOs to better manage resources and implement mitigation strategies for the present and the future. This study tests the applicability of the Growing Season Index (GSI) model in predicting future phenological changes using climate change scenarios datasets for the period (1951-2098). The results showed that (1) the GSI model performs well in predicting future phenological changes in the study region; (2) the predicted Normalized Difference Vegetation Index (NDVI) was correlated with future changes in GSI and showed a decreasing trend from 1951-2098 in Iraq; and (3) the Effective Growing Season Length (EGSL) has an interesting multi-decadal cycle in the climate change scenarios, however, generally, the trend for EGSL goes down for the period 1951-2098. These results suggest that climatic changes may exert phenological pressures on this region that could lead to shorter growing seasons and heightened pressures on agricultural production, suggesting the need to promote or enhance climate mitigation strategies across Iraq.