

# Evaluation of Climate Change Impacts on Wetland Vegetation in the Dunhuang Yangguan National Nature Reserve in Northwest China Using Landsat Derived NDVI

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Based on 541 Landsat images between 1988 and 2016, the normalized difference vegetation indices (NDVIs) of the wetland vegetation at Xitugou (XTG) and Wowachi (WWC) inside the Dunhuang Yangguan National Nature Reserve (YNNR) in northwest China were calculated for assessing the impacts of climate change on wetland vegetation in the YNNR. It was found that the wetland vegetation at the XTG and WWC had both shown a significant increasing trend in the past 20–30 years and the increase in both the annual mean temperature and annual peak snow depth over the Altun Mountains led to the increase of the wetland vegetation. The influence of the local precipitation on the XTG wetland vegetation was greater than on the WWC wetland vegetation, which demonstrates that in extremely arid regions, the major constraint to the wetland vegetation is the availability of water in soils, which is greatly related to the surface water detention and discharge of groundwater. At both XTG and WWC, the snowmelt from the Altun Mountains is the main contributor to the groundwater discharge, while the local precipitation plays a lesser role in influencing the wetland vegetation at the WWC than at the XTG, because the wetland vegetation grows on a relatively flat terrain at the WWC, while it grows on a stream channel at the XTG.

Keywords: NDVI, Wetland Vegetation, Climate Change, Precipitation, Air Temperature, Snowmelt

