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Study on variation of farming calendar with agricultural produce

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Introduction

Water cycle process play an important role on agriculture. Irrigation water takes 70%~80% of the world's water consumption. In order to evaluate the volume of agricultural water, farming calendar is variable. Especially in the North China Plain, where the second area plain in China, show 42% of the irrigation area in whole China. On the other hand, water resources for one person is only 15%. So water management is necessary for agriculture in a long time. The object of this study is to clear the farming calendar of the main agricultural produce,and also find variation of crop in the secular change.

Data and method

PAL(Pathfinder?Advanced?Very?High?Resolution?Radiometer?Land?Data?sets) dataset contain the AVHRR channels 1, 2, 4, 5 and NDVI. The space and time resolution are 8km, 10 days. There are 36 seasons data. In this study, we extract winter wheat NDVI pattern by using PAL NDVI from 1982 to 2000.

SPOT vegetation dataset is from Spot 4 and 5 that can observe the land surface vegetation condition. It's 10 days composite maximum NDVI. Space and time resolution are 1km, 10days. We also extract winter wheat NDVI pattern from 1999 to 2012 by using SPOT NDVI.

The meteorologic data of the province of North China Plain can be free downloaded from China Meteorological Data Sharing Service System. which used to discussion the variation of farming calendar.

SRTM(Shuttle?Radar?Topography?Mission) is DEM(Digital?Elevation?Model) data, produced by NASA(National?Aeronautics?and?Sp DLR(Deutsches?Zentrum?fur?Luftund?Raumfahrt) and ISA(Italian?Space?Agency) in 2000. Based on the geography of North China Plain, we validate the distribution of winter wheat.

In the field research, we set 60 training points, through the information we extract the season NDVI pattern of the land use. Depend on season features, we can confirm the farming calendar and winter wheat area.

Result

Sowing and harvest season of winter wheat on farming calendar were changed every years. From 1982 to 2012, space and time variation of winter cheat area is cleared. In recent decades, we also found the area of winter cheat is decreasing.

Discussion

In autumn, average temperature, average precipitation with the change of winter wheat seeding season have positive correlation. In spring, average temperature is increasing but no obvious variation with precipitation. Because of more evaporation in spring, more water was used for agriculture . Most irrigation water is from groundwater in North China Plain, it cause the groundwater level down, ground sinking and so on. Water shortage problem can be thought a main reason on delay of grow and harvest. However Chinese Government start South-to-North Water Diversion Project in 12 Dec 2014. In the future, we will have more research on the influence on farming calendar.

Compared the result of winter cheat area and statistics data, they agree with each other very well. The results obtained by superposing the elevation data, winter cheat area can be found in the plain.

Summary

As one of the most famous agricultural produce in China, North China Plain have remarkable water shortage problem. In this study, firstly, we used satellite remote sensing to summarize farming calendar in North China Plain. Secondly, we extracted winter wheat area by the season PAL and SPOT NDVI pattern in 30 years.

Keywords: North China Plain, farming calenda, winter wheat, water shortage