THE CHANGE CHARACTERISTICS OF SANDSTORM IN GANSU PROVINCE AND ITS IMPACTS TO AGRICULTURE

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Sandstorm is a kind of unique meteorological disasters formed in a special geographic and climatic condition. The atmospheric environmental issues, land desertification problem, people's lives and property safety problems caused by dust storms have been highly concerned by the whole society. Gansu is one of regions of sandstorms occurring at the highest yearly frequency. The present research has focus on the variation in the number of Sandstorm days on a seasonal basis, to provide scientific basis for the disaster combating , Sustainable economic and social development, to provide protection for the people well-being services. By using data consisting of 1960 – 2006 detailed sandstorm records from 75 stations over Gansu Province, we calculated the number of days in winter (DJF), spring (MAM), summer (JJA) and autumn (SON) for all the years. The numbers were normalized and the time-dependent variation in the seasonal number was represented by a second-order main-value function and the change in period by the wavelet analysis (Yang, 2000; Chen et al., 2004). The results show:

1) The sandstorm days are the most in spring, and the sandstorm days in summer are more than those of winter, the least days are in autumn. Seasonal sandstorm days have declined in recent 47 years, and they represent the 6-year and 9-year periodic oscillation by the wavelet analysis. The sandstorm days in spring has obviously negative correlation with the damaged agricultural area. After the middle of 1980s, the sandstorm days decreased, but the damaged agricultural area has increased. The reasons are climate warming, more human activities and strong sandstorm rising.

2) The sandstorm days in winter has decreased. From 1960 to 1983, the sandstorm days were more. After the middle of 1980s, the sandstorm days decreased. The wavelet analysis showed, the sandstorm days in winter present the 6-year,9-year and 12-year oscillations change.

3) Sandstorms has occured every year in Gansu Province, but the extent of the impact on agriculture varied. According to the sandstorm disaster data in Gansu Province from 1971 to 2006, the average harmed agricultural area caused by sandstorm are $2.55\times104hm^2$. Nearly 47 years, there are several exceptionally strong sandstorms severely damaged to the agricultural production and safety of people's lives in Gansu Province. On May 5, 1993, there was a large-scale regional Strong Sandstorm in the

Hexi Corridor, it harmed seriously. The disaster data showed, the harmed farmland are 169500hm^2,dead 61 persons, hurted 208 persons, the direct economic losses are 242 hundred million yuan. In 2006, according to incomplete statistics, because of the sandstorm, the disaster population is 54,181, the crops get no crop area is 22,402 hectares, the death large domestic animals are 6873 heads, the direct economic losses are 163 hundred million yuan.

The experience and studies show that the control or reduction the harm caused by sandstorm is possible to accomplish. Such as, developing the effective strong sand storm weather protection system, strengthening the environment government, taking the effective measures, preventing the land desertification, strengthening the protective forest construction and the degenerated ecology region restoration governmen.

Key words: Gansu Province; sandstorm change; agricultural production, wavelet analysis