

A Synoptic Meteorological Study of the Occurrences Extreme Heat that Impact Human Health

Woo-Sik Jung¹, Jong-Kil Park¹, Eun byul Kim^{1*}

¹Inje University, Korea

As abnormal weather phenomena occur with great frequency due to climate changes, there has been an increase in damages due to weather phenomena such as extreme heat and cold waves. Among these, damages due to extreme heat in particular have great relevancy to the occurrence of deaths and injuries to persons. It is a noted fact that many deaths occurred in the extreme heat in Chicago, U.S.A in 1995 and in Europe in 2003, and in 1994 deaths also arose due to the extreme heat in Seoul, South Korea. With this rise in damages due to the occurrence of extreme heat, studies have been conducted on the impact on human health that occurs during the periods of extreme heat. However, the majority of studies on the damages caused by extreme heat that have hitherto been conducted in Korea have been focused on a single meteorological element such as temperature or humidity, and were implemented based on observation data from one site covering a single metropolitan area. This method of study poses difficulties in analyzing the specific meteorological characteristics of the region where the extreme heat occurs, and furthermore can bring about erroneous results in evaluating the health impact of the extreme heat occurrences. Therefore, this study seeks to find means to resolves such problems exhibited by pre-existing studies on the damages due to extreme heat. For this purpose, analyses were conducted on the synoptic meteorological characteristics of the actual days on which extreme heat occurred in the last 15 years. This is significant because it allows us to identify not only the local meteorological characteristics regarding the extreme heat which may have an impact on human health, but also enables us to illuminate the meteorological characteristics on a synoptic scale, and thus making it possible not only to improve the accuracy of extreme heat forecasts but also to expand the forecast leading time. In addition, under conditions in which the synoptic meteorological characteristics are identical, comparative examinations was made with the deaths that occur in the metropolitan area. The studies that are currently being conducted in Korea take as their subject the city of Seoul in 1994, but this study also takes into consideration an evaluation of the deaths due to extreme heat that happened in other metropolitan areas. As it is predicted that the severity of the damages due to extreme heat will intensify in the future, we judge that the accurate understanding of air masses that can cause extreme heat damages as presented by this study will contribute to reducing such damages.

Acknowledgments "This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government(MEST) (No. 2009-0092800)."

Keywords: Synoptic Meteorology, Extreme heat, Human health, Korea, Climate change