Analysis of Measures for Strengthening the Protection of Meteorological Detection Environments in the New Era

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Abstract Meteorological detection environments hold a fundamental and pioneering position in the development of meteorological undertakings, serving as the scientific support for accurately conducting weather forecast, professional meteorological services, and disaster prevention and mitigation decision. The safety and stability of meteorological detection environments are of vital importance, and any behavior that damages or affects the detection environments is not allowed. In this paper, the factors influencing meteorological detection environments in the new era were explored, and measures to protect meteorological detection environments were proposed, such as strictly implementing the protection system of meteorological detection environments, lawfully investigating and punishing destructive behaviors, intensifying the publicity of the protection law, and enhancing public awareness.

Key words Meteorological observation environment; Safety impact; Protective measures

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A meteorological detection environment is an important foundation for conducting meteorological detection business work and also the most front-end part of the entire meteorological work. A good and stable meteorological detection environment can ensure the accuracy, continuity, timeliness and representativeness of meteorological detection information, playing a significant role in improving the level of weather and climate prediction and forecasting, strengthening the prevention of meteorological disasters, and ensuring the safety of people's lives and property. Therefore, it is necessary to protect the surrounding environment and facilities of meteorological detection stations (fields) from being damaged or disturbed[1]. In recent years, the economy and society have developed rapidly, and the scale of urban construction has been increasing. Besides, more and more factories and enterprises have been built around cities, and the influence of people's activities has also been expanding. As a result, the contradiction with meteorological detection and environmental protection has become increasingly prominent, and incidents of damage to meteorological detection environments and facilities occur from time to time. This phenomenon directly affects the normal operation of meteorological detection work, and is not conducive to the improvement of emergency response capabilities when extreme weather and climate events occur in this region[2]. For this reason, meteorological departments should attach great importance to the significance of protecting meteorological detection environments. In accordance with the laws on the protection of meteorological detection environments and the urban and rural construction planning, efforts should be made to improve and restore the damaged meteorological detection environment, and the special planning for environmental protection should be incorporated into the content of urban and rural construction planning to achieve the joint implementation of the plans. For the stations that need to be relocated, a new location should be selected and constructed to effectively ensure the stability and reliability of meteorological detection environments and facilities.

1 Current situation of protection work for meteorological detection environments

Only when a meteorological detection environment is stable for a long time can timely, accurate and comprehensive observation data be obtained. Any destructive behavior that adversely affects the stability of a detection environment may affect the quality of meteorological detection services, thereby affecting the accuracy and timeliness of weather forecast and restricting the smooth progress of disaster prevention and mitigation work[3]. In recent years, meteorological departments at all levels in Ulanqab City have made unremitting efforts in protecting meteorological detection environments. They strictly abide by the laws and regulations on the protection of meteorological detection environments, and conduct regular inspections and supervision of meteorological detection environments. Once any destructive behavior that is detrimental to the safety and stability of meteorological detection environments should be promptly stopped. For illegal acts that seriously threaten meteorological detection environments, meteorological departments should promptly stop them and dealt with them in accordance with the laws. To enhance the awareness of the general public and construction units regarding the significance of protecting meteorological detection environments, on important festivals such as World Meteorological Day and Disaster Prevention and

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Mitigation Day, Ulanqab City has entered schools, enterprises, communities, villages and other places to actively carry out science popularization lectures and publicity activities, distributing science popularization brochures and posting publicity posters, *etc.* Meteorological laws and regulations and knowledge about the protection of meteorological detection environments should be popularized to the public to guide the public to enhance their awareness of voluntarily protecting meteorological detection environments, such as not constructing tall buildings that affect meteorological detection environments, not planting tall trees, crops, *etc.* that affect meteorological detection environments, and not setting up high-frequency electromagnetic radiation devices or interference sources around meteorological observation fields (stations). At the same time, media platforms should be fully utilized to publish copy about the protection of meteorological detection environments, shoot short videos, *etc.* Besides, the public and relevant enterprises and construction units should voluntarily abide by the laws and regulations on the protection of meteorological detection environments, so as to create a favorable atmosphere for protecting meteorological detection environments throughout society.

2 Factors influencing meteorological observation environments

2.1 Threats to the safety of meteorological detection environments posed by urban construction and development The laws on meteorological detection environments stipulate that no trees, buildings or other objects that may affect the detection equipment can be planted or constructed around an observation station (field). If they must exist, they should be kept at a certain distance from the fences of an observation station (field)[4]. Due to the requirements of meteorological observation stations for the surrounding environment, these stations (fields) are all initially built in the suburbs of cities or remote areas away from towns. In recent years, with the rapid development of society and economy, the corresponding urban construction planning has been continuously expanding to the suburbs. The number and height of urban buildings have been increasing, so that high-rise buildings and industrial enterprises have been constantly emerging around the original observation stations (fields). These increasing groups of buildings have gradually surrounded the observation stations (fields), destroyed meteorological detection environments, and caused errors between meteorological detection data and actual values. As a result, the data of temperature, humidity, precipitation, wind speed and wind direction have lost their authenticity and representativeness.

2.2 Weak awareness of protecting meteorological detection environments According to the Article 20 of the *Measures for the Protection of Meteorological Detection Environments and Facilities*, when approving construction projects around meteorological stations, relevant departments such as urban and rural planning, urban construction, and land and resources, should consider the influencing factors of the safety of meteorological detection environments. The above-mentioned departments will not approve construction projects that may have an impact on meteorological detection environments and have not obtained the consent of the meteorological authority. In fact, relevant departments do not have a clear awareness of protecting meteorological detection environments, so they approved the construction without prior communication and coordination with meteorological departments. Due to poor communication among the departments and inadequate supervision by meteorological departments, the detection environment at a meteorological observation station (field) has been destructed. Meanwhile, some people lack understanding of meteorological work and even the importance of meteorological detection environments. Many people believe that as long as they do not touch instruments and equipment, there will be no impact on the environment. Therefore, some behaviors, such as cultivating and planting around an observation field and walking around it freely, will have an impact on meteorological observation data to a certain degree.

3 Measures to strengthen the protection of meteorological detection environments

Meteorological detection environments are the "lifeline" of the meteorological cause. The normal functioning of observation instruments and equipment within meteorological observation stations (fields) is highly dependent on the scientificity and safety of meteorological detection environments. Therefore, strengthening the protection of meteorological detection environments is of great significance. Man-made destruction, namely the destruction of production and life, is the main cause of meteorological detection environments. According to the relevant provisions of the *Regulations on the Protection of Meteorological Facilities and Meteorological Detection Environments*, it is clearly stipulated that within 500 m around the observation fields of national benchmark climate stations and national basic meteorological stations, the construction of high-rise buildings, the setting up of garbage dumps, sewage outlets, *etc.* are prohibited, and within 200 m around the observation fields of national general meteorological stations, the setting up of garbage dumps, *etc.* is prohibited; individuals or enterprises, relevant departments, *etc.* that damage the facilities of meteorological observation fields shall bear repair costs and administrative penalties.

3.1 Strictly enforcing the administrative licensing system for the protection of meteorological detection environments The relevant departments of Ulanqab City are required to strictly abide by the requirements of laws and regulations such as the *Meteorology Law of the People's Republic of China*, and earnestly implement the administrative licensing system for the protection of meteorological detection environments. For urban and rural development plans and proposed construction projects that may have an impact on the protection of meteorological detection environments in use, they must obtain the opinions of meteorological departments in advance in accordance with the regulations. It is resolutely prohibited for newly built, expanded or renovated projects that have a se-

rious impact on meteorological detection environments to start construction without approval and permission. Meteorological stations need to maintain long-term stability. If urban development has already threatened the existing meteorological stations and after investigation, it is indeed necessary to relocate them, a comprehensive planning, scientific site selection, and reasonable layout should be carried out to determine the location of a new station with the consent of meteorological administrative departments at or above the provincial level, which is conducive to achieving the coordinated development of urban and rural construction and the protection of meteorological detection environments.

3.2 Investigating and dealing with all kinds of behaviors that damage meteorological detection environments in accordance with the law In light of the speed and trend of social and economic development in the new era, it is needed to further improve the collaboration and communication mechanism between meteorological departments and local governments, and jointly do a good job in the protection of meteorological detection environments and facilities. Meteorological, urban construction, planning, and land and resource departments should enhance daily communication, conscientiously perform their duties, carry out special inspections, and handle seriously any violations of the regulations on the protection of meteorological detection environments and facilities. If any unit or individual sets up obstacles within the protection range of meteorological detection environments, meteorological departments should promptly and strictly stop such behavior. If meteorological detection environments are seriously affected and damaged, the local government should be requested to carry out special law enforcement inspections, formulate solutions, investigate and deal with them in accordance with the law, and implement law enforcement penalties to units and individuals.

3.3 Strengthening the publicity of the protection work of meteorological detection environments Meteorological departments at all levels in Ulanqab City should adopt various forms of meteorological science popularization and publicity. On the basis of on-site explanations, setting up display stands, distributing publicity brochures and posting publicity posters, they should increase online publicity efforts, and use platforms such as wechat, Weibo official accounts, Douyin, Kuaishou and Wevideo to produce animations, videos and other popular science content, so as to publicize to the public the significance of protecting meteorological detection environments, enhance the public's awareness of the importance of protecting meteorological detection environments, and create a favorable atmosphere throughout society for jointly protecting meteorological detection environments. Meanwhile, meteorological departments at all levels should promptly disclose to the public the scope and standards for the protection of meteorological detection environments. Local governments should set up warning signs outside meteorological observation sites, clearly define the range of protected areas, prevent damage to meteorological detection environments and facilities.

4 Conclusion

To enhance the protection of meteorological detection environments in the new era and further raise the awareness and behavior of the whole society in participating in the protection of meteorological detection environments, the Ulanqab Meteorological Bureau should do a good job in the protection of meteorological detection environments, clarify that meteorological departments are the first person responsible for the protection of meteorological observation facilities and meteorological detection environments, increase the inspection of meteorological detection environments, and increase the number of installed cameras to ensure that there are no blind spots or dead zones in positioning. At the same time, it is necessary to enhance communication among departments, earnestly perform the functions of supervision and inspection, and ensure early detection, early reporting and early handling of problems existing in meteorological detection environments. Besides, it is needed to promote the comprehensive implementation of the protection of meteorological detection environments in accordance with the law, and give full play to the role of meteorological detection environments as the first line of defense in disaster prevention and mitigation.

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