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汶川 M_S 8.0级大震前天基与陆基电场资料联合应用研究

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A study of the electric field before the Wenchuan 8.0 earthquake of 2008 using both space-based and ground-based observational data

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摘要

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摘要 利用边际谱方法对2008年5月12日四川汶川地震前天基和陆基电场变化情况进行了联合分析研究, 结果表明: (1)空间电场方面, 由重复轨道和连续轨道电场边际谱演化看出, 电离层电场从2008年4月27日左右开始, 其边际谱出现了明显的增强现象(增大1~2个量级), 这种现象一直持续到汶川地震发生。(2)陆基电场方面, 中法合作的松山台从4月25日~29日开始出现电场边际谱增强现象(增大2个量级), 成都台、陇南台和天水台在4月10日~14日开始出现了边际谱增强现象(增大2个量级), 天水台和陇南台边际谱增强现象出现时间与成都台相差不大, 但结束时间不完全相同, 松山台、天水台的结束时间要早于陇南台和成都台。(3) 陆基和空间电场边际谱出现增强现象的时间来看, 二者有较好的一致性。

关键词: 汶川地震 天基和陆基电场 联合应用研究 边际谱 DEMETER卫星

Abstract: We studied the changes of the electric field before the Wenchuan M_S 8.0 earthquake of 2008 using both space-based and ground-based observational data and the method of marginal spectrum. The evolution of marginal spectrum of the electric field from the repeat orbits and continuous orbits reveals that the marginal spectrum of the electric field in the ionosphere had a remarkable increase (about 1~2 orders of magnitude) from the 27th April, 2008 to the time when the Wenchuan earthquake happened. For the evolution of marginal spectrum of the electric field from the ground-based data, the marginal spectrum of Songshan station of Sino-French cooperation began to enhance (increased by 2 orders of magnitude) from 25th~29th, April, 2008. Such a phenomenon appeared at Chengdu, Longnan and Tianshui stations (increased by 2 orders of magnitude) from 10th~14th, April, 2008. Despite that the marginal spectrum enhancement was identical at Chengdu, Longnan and Tianshui stations, but it ended at different times. This process ended earlier at the Songshan and Tianshui stations than the Chengdu and Longnan stations. It seems that the enhancement of marginal spectra of both the ground and space electric fields happened at a roughly same time.

Keywords: Wenchuan earthquake The electric field of space-based and ground-based Study of integrate application Marginal spectrum DEMETER satellite

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