

中国广东电网的几次强磁暴影响事件

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摘要 2001年以来,随着我国阳\淮系统等多条500 kV长距离线路的相继建成投运,江苏上河、广东岭澳等地变压器多次发现不明原因的强烈振动和噪声增大事件.本文通过对2004年11月以来、十几次磁暴地磁数据与变压器中性点实测电流数据的比较,证明了干扰事件是磁暴在电网产生的地磁感应电流(GIC)所为;其中,2004年11月7日和10日磁暴在岭澳核电站引发的GIC最大值为47A和55.8A,大于直流输电单极运行时变压器中性点的直流电流水平,因此磁暴对岭澳核电站的瞬时影响比直流输电的影响大;监测数据表明广东电网的GIC水平高于阳淮输电系统的水平,初步分析认为与电网结构和海岸效应等因素有关.目前,举世瞩目的1000 kV特高压工程已开工建设,特高压线路的单位电阻最多是500 kV的二分之一,并且线路更长、规划规模大、且变压器采用单相变压器组结构,磁暴影响问题迫切需要研究.

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Strong magnetic storm's influence on China's Guangdong power grid

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Abstract With the Yang-Huai power transmission system and other 500 kV long-distance transmission lines' coming into operation since 2001, unknown severe transformer vibration and increased noise have often been found in Shanghe of Jiangsu and Ling' ao of Guangdong. This paper gives a comparison of more than ten magnetic storms and measured transformer neutral current data since November, 2004, and proved that the disturbances were caused by geomagnetically-induced current (GIC). On the 7th and 10th, November, 2004, the maximal magnetic storm caused GIC in Ling' ao Nuclear Station was 47A and 55.8A, both larger than the transformer neutral DC level in HVDC' s monopole operation, so, magnetic storms' instantaneous influence is larger than HVDC' s. And the data show that GIC level in Guangdong Power Grid is higher than that of the Yang-Huai power transmission system, by initial analysis it' s considered to be related with grid structure and coast effect etc. By now, the widely concerned 1000kV UHV power transmission system has begun constructing, and the UHV line' s unit resistance will be at most half of the 500 kV line' s, and in condition of longer transmission line, larger scale and single-phased transformer' s adoption, the issue of magnetic storm' s influences will be more urgent to be studied.

Key words [Magnetic storm](#); [Geomagnetically-induced current \(GIC\)](#); [DC magnetic bias](#); [UHV power transmission](#)

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