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中文题目：东亚夏季风对不同种类人为气溶胶的平衡态气候响应

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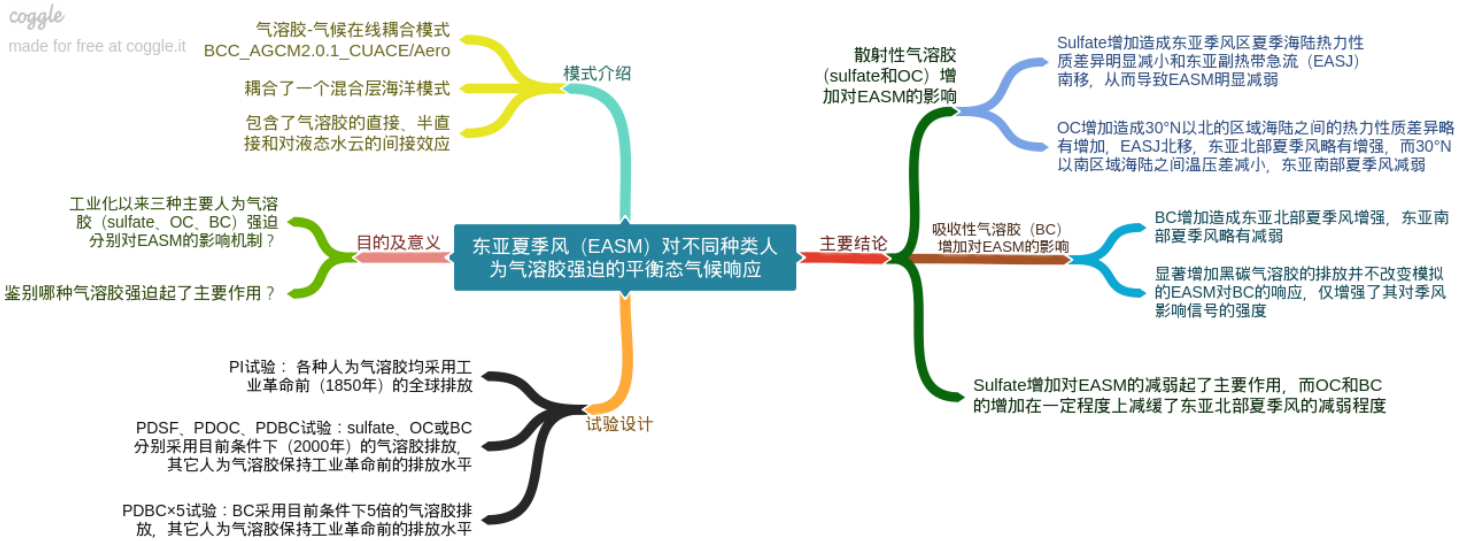
中文摘要：利用一个耦合混合层海洋模式的气溶胶-气候在线耦合模式 BCC_AGCM2.0.1_CUACE/Aero 研究了东亚夏季风（EASM）系统对 1850-2000 年不同类型人为气溶胶（硫酸盐、黑碳和有机碳）排放增加的平衡态响应。结果表明，硫酸盐增加造成海陆之间温压差减小，EASM 明显减弱。有机碳增加造成 30 ℃N 以北海陆之间热力性质差异略有增加，东亚北部夏季风增强；而中国南部海陆之间热力性质差异减小，东亚南部夏季风减弱。黑碳增加对东亚夏季 850 hPa 风场和降水影响的分布和有机碳气溶胶的影响大体一致。此外，显著增加黑碳的排放并不改变模拟的 EASM 对黑碳的响应，仅增强了其对季风影响信号的强度。总体来说，硫酸盐的增加对 EASM 的减弱起了主要作用，而有机碳和黑碳的增加在一定程度上减缓了东亚北部夏季风的减弱程度。



英文题目：Equilibrium Climate Responses of the East Asian Summer Monsoon to Various Anthropogenic Aerosol Species

作者：WANG Zhili*, WANG Qiuyan, and ZHANG Hua

英文摘要：The equilibrium climate responses of the East Asian summer monsoon (EASM) to increases in various types of anthropogenic aerosol emissions, including sulfate, organic carbon (OC), and black carbon (BC), from 1850 to 2000 are studied using an aerosol-climate online model. The results show that various aerosol species have substantially different impacts on the EASM by changing the local sea-land thermal difference and atmospheric circulation. The increased sulfate leads to decrease in the thermal difference between the land and ocean, the southward shift of the East Asian subtropical jet (EASJ), and significant northerly wind anomalies at 850 hPa over eastern China and the ambient oceans, thus dampening the EASM markedly. Pronounced surface cooling appears and an anomalous anticyclone is formed over the oceans north of 30 ℃N due to the increase of OC. These cause slight increase in sea-land thermal difference and southerly flow anomalies to the west of the anticyclonic center, thereby strengthening the northern East Asian summer monsoon (NEASM). However, the increased OC decreases the sea-land thermal contrast over southern China, which weakens the southern East Asian summer monsoon (SEASM). The responses of summer 850 hPa winds and rainfall over the East Asian monsoon region (EAMR) to increase in BC are generally consistent with those to increase in OC. The increased BC leads to the strengthening of the NEASM north of 35 ℃N and slight weakening of the SEASM south of 35 ℃N. Also, the simulated responses of the EASM to increase in BC are not changed when BC emission is scaled up by five times its 2000 levels, but the intensities of responses are enhanced. Overall, the increase in sulfate primarily weakens the EASM, while the increases in BC and OC mitigate the weakening of the NEASM to some extent.