East Asian dust source areas are frequently covered by snow. We conducted a sensitivity study of East Asian dust storms to investigate the effects of snow cover and soil moisture with our global aerosol model. The simulated dust concentration of the control experiment underestimated the dust event in late March 2007 relative to the observed PM10 concentration. When the effect of soil moisture is not taken into consideration, the simulated total dust emission amount is almost doubled, and the simulated dust concentration is comparable or slightly overestimated with regard to the PM10 observations. In contrast, the simulated dust concentration of the control experiment is in agreement with the observed PM10 concentration in May, suggesting that the effects of snow cover and soil moisture on the dust event in May were very small because snow cover disappeared and the ground became dry during April to early May. To improve our ability to forecast Asian dust events in March, the treatment of the hydrological cycles of snow in the land surface model and the soil moisture dependence of dust emission flux should be regarded as the key factors.