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# Source apportionment of atmospheric water over East Asia – a source tracer study in CAM5.1

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The atmospheric water tracer (AWT) method is implemented in the Community Atmosphere Model version 5.1 (CAM5.1) to quantitatively identify the contributions of various source regions to precipitation and water vapour over East Asia. Compared to other source apportionment methods, the AWT method was developed based on detailed physical parameterizations, and can therefore trace the behaviour of atmospheric water substances directly and exactly. According to the simulation, the tropical Indian Ocean is the dominant oceanic moisture source region for precipitation over the Yangtze River Valley and South China in summer, while the Northwest Pacific dominates during other seasons. Evaporation over the South China Sea is responsible for only 2.7–3.7% of summer precipitation over the Yangtze River Valley and South China. In addition, the Indo-China Peninsula is an important terrestrial moisture source region (annual contribution of $\sim$10%). The overall relative contribution of each source region to the water vapour amount is similar to the corresponding contribution to precipitation over the Yangtze River Valley and South China. A case study for the South China Sea shows that only a small part ($\leq$5.5%) of water vapour originates from local evaporation, while much more water vapour is supplied by the Northwest Pacific and tropical Indian Ocean. In addition, because evaporation from the South China Sea represents only a small contribution to the water vapour over the Yangtze River Valley and South China in summer, the South China Sea mainly acts as a water vapour transport pathway where moisture from the tropical Indian Ocean and Northwest Pacific meet.