Weather radar detection of tropical mixed-layer top capping forest-fire smog over maritime-continent peatland

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Space-borne and ground-based radars have revealed dominant diurnal-cycle land-sea migration of the world’s most active precipitating convective clouds along the longest coastlines of the Indonesian maritime continent. The radar observation is uniquely important, because this region is almost free from cyclones and oceanic super cloud clusters and the weather maps are almost useless near the equator. Here we propose also a capability of ground-radar detection of the mixed-layer top before start/passage of rainfall. This weather condition is responsible for capping pollutant and smog produced at the ground, which are extremely serious in many coastal peatlands and cities developed rapidly over the maritime continent. Such less rainfall situations are escalated with less rainfalls in El Niño events, and the greenhouse gasses emitted there accelerate the global warming. Those gaseous constituents and droplet particles cannot be detected directly by radars but their existence may be indicated indirectly by radar detection of the mixed-layer top. Some results at Palangkaraya C-band radar of Indonesian Meteorological, Climatological and Geophysical Agency (BMKG) in Kalimantan are demonstrated (see Fig. 1). Further applications are also discussed.

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