Atmospheric
Measurement
Techniques
Discussions

Open Access

Supplement of

MODIS Collection 6 shortwave-derived cloud phase classification algorithm and comparisons with CALIOP

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From 1.38 Micron Test

Cloud Effective Radii Tests

Snow Ice Surface and Liq. COT < 3

$R_{2.13}/R_{1.24} < 0.45$ — Yes →

$R_{2.13}/R_{1.24} > 0.7$

Yes ↓ → Ice Cloud Phase Vote: $i = i - 1$

Yes ↓ → Liq. Cloud Phase Vote: $i = i + 1$

No

$R_{1.6}/R_{1.24} < 0.2$ — No →

$R_{1.6}/R_{1.24} > 0.45$ → To Cold Cloud Sanity Check

Yes ↓ → Ice Cloud Phase Vote: $i = i - 1$

Yes ↓ → Liq. Cloud Phase Vote: $i = i + 1$

No

do WL in [1.6; 2.1; 3.7 micron]

Liq. RSS > 0 and Ice RSS > 0 — Yes →

Ice Re = Ice Re Max — Yes → Ice Cloud Phase Vote: $i = i - 1$

No

Liq. Re = Liq. Re maxmins — Yes → Liq. Cloud Phase Vote: $i = i + 1$

No

Ice Re > High — Yes → Ice Cloud Phase Vote: $i = i - 1$

No

Ice Re < Low — Yes → Liq. Cloud Phase Vote: $i = i + 1$

No

Ice RSS > 0 and Liq. RSS = 0 — Yes → Liq. Cloud Phase Vote: $i = i + 1$

No

end do

To Cold Cloud Sanity Check

From Cloud Effective Radii Tests

Cold Cloud Sanity Check

i = 0
or
i = + 1

Yes → Ice COT > 40

Ice COT > 40 — No

Ice COT > 40 — Yes

IR Cloud Phase = ice or (CTM < 3 and CTT < 240) — No

IR Cloud Phase = ice and (CTM < 3 and CTT < 240) — No

IR Cloud Phase = ice or (CTM < 3 and CTT < 240) — Yes

IR Cloud Phase = ice and (CTM < 3 and CTT < 240) — Yes

Ice Cloud Phase Vote: i = - 1

i = 0 or i = + 1 — No

VNSWIR Cloud Phase Decision

i > 0 — Yes → Cloud Phase = Liquid

i > 0 — No

i < 0 — Yes → Cloud Phase = Ice

i < 0 — No

i = 0 — Yes → Cloud Phase = Undet.