ISCCP cloud data

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available products (1)

- **Products - now**
  - ***Cloud cover***
  - ***Cloud top pressure***
  - ***Cloud optical thickness***
- **temporal / spatial resolution**
  - ***3hr, 30km***
  - ***3hr, 280km***
  - ***monthly, 280km***
- **time-period**
  - ***7/1983 to now*** *and proposed to 2010*

available products (2)

- **Products – in near the future**
  - *(daily) cloud particle size*
  - *Cloud type co-locators*
    - Mesoscale convection
    - Mid-latitude cyclones
- **Complementing data-sets**
  - *AVHRR (Pathfinder)*
  - *HIRS*
    - Wisconsin
    - 3I
  - *Surface observations*
  - *SAGE (for upper troposphere)*

product accuracy

overall (globally, annually)

- **Cloud cover**
  - *< 10% instantaneously < 3% monthly*
  - *missed thin cirrus 5-10% additionally*
- **Cloud top pressure**
  - *< 100mb instantaneously < 50 mb monthly*
  - *bias: low for marine stratus / high for 2-layer clouds*
- **Cloud optical depth**
  - *<15% instantaneously <7% monthly*
  - *not available during winter and polar night*
  - *note:*
    - reduced accuracy in polar regions
    - Information on upper layer only

aerosol complement?

- **Now**
  - *No*
- **Future**
  - *Maybe:*

    when data on aerosol and clouds can be associated at smaller than synoptic time scales (< 1 day)
  - *LEO is not good enough*
  - *GEO is promising (e.g. MSG every 15min)*

what data should be used?

- **for cloud processes:**
  - ***use all available data-sets***
    - **products with most detail on clouds lack temporal resolution**
    - **products with better time-resolution have limited cloud info**
- **for cloud system evolution**
  - ***use data-set with both***

  (1) better time-resolution, (2) better time record length

  (ISCCP has smallest time-sampling and longest data-record)
- **for general circulation**
  - ***use data-sets with both***
  - ***(1) global coverage, (2) long time record length***

  (ISCCP has the longest record with global coverage)

accuracy by cloud type

- **Cloud droplet eff.radius**
  - *Liquid: +/- 1μm*
  - *Ice: +/- 7μm*
    - radiometric calibration might cause add. 2μm uncertainty
- **Cloud optical depth**
  - *Liquid: +/- 10%*
  - *Ice: +/- 15%* *(3D-effects, ice-crystal size uncertainty)*
- **Cloud albedo**
  - *Liquid: +/- 5%*
  - *Ice: +/- 5%*

size - representation

- **'MEAN' refers to mass average**
- **Optical methods**

  [size is retrieved from the uppermost opt.thickn. (τ: < 3)]

  Underestimate:

  – ***50% for clouds with optical thickness < 5***

  – ***75% for clouds with optical thickness <15***

- **Combined optical methods and microwave methods**

  Good size estimates possible for liquid water clouds

  (may also indicate drizzle onset)