Antarctic Abbreviated Weather Observing Program (AAWOP) ©

OBJECTIVE

Understand what AAWOP is, and be able to encode / decode AAWOP observations

Standard

To take, record and transmit data to designated weather center.

Antarctic Abbreviated Weather Observing Program©

- **REASONS FOR AAWOP**
- **GENERAL INSTRUCTIONS**
- **CODE BREAK DOWN**
- **BASIC OBSERVING SKILLS**
- **EXAMPLES**
- **QUESTIONS ON AAWOP**
- **KESTREL TRAINING**

What is AAWOP used for?

- Provides vital ground truth information to forecasters.
- Assists on the timing, bias and verification of the Antarctic Mesoscale Prediction System (AMPS) Model.
- Helps to get deep field teams SAR support, resupply and on time exfills. It is very frustrating to sit waiting for a pickup under sunny skies. The more ground data the forecaster has, the less pessimistic the forecast will be, and the quicker the pickup.

General Instructions

- Standard is, Morning and Evening on non fly days.
- Six hours prior to takeoff and then hourly until arrival on flying days.
- These observations require a high priority to ensure transmission within 15min of the time they are taken. (timeliness is key, always by the top of the hour)
- The approximate time needed to take, record, encode, and transmit a single observation is 10 to15min.

Report Sheet

Camp Name_____Location

#1_____ Direction of winds (table 1)

#2_____Speed of winds (table 2)

#3_____Visibility at Surface (table 3)

#4_____Present Weather (table 4)

#5_____Amplification of present weather (table 5)

#6_____CLOUD LAYER 1 (table 6)
6a_____CLOUD LAYER 2 (if needed)
6b_____CLOUD LAYER 3 (if needed)

#7_____Total Sky Cover (table 7) (Total of 6a,b,c)

#8_____ Temperature / Dewpoint in Celsius (table 8)

#9_____Barometric Pressure in inches (table 9)

#10_____REMARKS (table 10)

Entry #1
Wind Direction (2 minute average)

CODE DIGET #1	GRID DIRECTION WIND IS FROM	DEGREES
0	CALM	NONE
1	NORTHEAST (NE)	023 to 067
2	EAST (E)	068 to 112
3	SOUTHEAST (SE)	113 to 157
4	SOUTH (S)	158 to 202
5	SOUTHWEST (SW)	203 to 247
6	WEST (W)	248 to 292
7	NORTHEAST (NE)	293 to 337
8	NORTHWEST (NW)	338 to 022
9	VARIABLE (MUST BE 6KTS OR LESS)	N/A

Entry #2
Wind Speed (2 minute average)

CODE DIGIT #2	EXPLANATION	KNOTS
0	CALM	LESS THAN 3 KTS
1	LIGHT BREEZE	4 to 6 KTS
2	GENTLE BREEZE	7 to 10 KTS
3	MODERATE BREEZE	11 to 16 KTS
4	FRESH BREEZE	17 to 21 KTS
5	STRONG BREEZE	22 to 27 KTS
6	NEAR GALE	28 to 33 KTS
7	GALE	34 to 40 KTS
8	STRONG GALE	41 to 47 KTS
9	STORM	48 to 55 KTS

Entry #3
Visibility (Average of all quadrants)

Code Digit #3	Visibility
0	Less than 100M (< 328 Feet)
1	100 to less than 400 Meters (328 to less than 1311 Feet (1/16 Mi to < 1/4 Mi)
2	400 to less than 800 Meters (1312 to less than 2640 Feet [1/4 Mi to < 1/2 Mi)
3	800 to 1199 Meters (2640 to 3933 Feet [1/2 Mile to Less than 3/4 Mile])
4	1200 to 1599 Meters (3/4 Mile to less than 1 Mile)
5	1600 to 2399 Meters (1 Mile to less than 11/2 Mile)
6	2400 to 3199 Meters (1 1/2 Mile to less than 2 Miles)
7	3200 to 4799 Meters (2 Miles to less than 3 miles)
8	4800 to 9000 Meters (3 Miles to 6 Miles)
9	Greater than 9000 Meters (Greater than 6 Miles)

Entry #4
Weather and Obstructions
(at your location)

PRESENT WEATHER AND OBSTRUCTION TO VISION
(Can have a combination of types)
e.g. 2 and 9, 1 and 8, 2 and 5, 1 and 5 and 9 etc.)

Code Digit #4	
0	No Weather
1	Snow (less than 9 on entry #3 and steady precipitation)
2	Snow Grains (less than 9 on entry #3 and steady precipitation)
3	Ice Crystals (can occur at any visibility)
4	Fog (Only reported with Number 0-3 on #3 Visibility Page)
5	Mist (Reported with Number 4-9 on #3 Visibility Page
6	Snow Showers (less than 9 on #3 and precip starts and stops)
7	Ice Pellets (rare) (less than 9 on entry #3 and steady precipitation)
8	Blowing Snow (Visibility less than 9 on entry #3)
9	Drifting Snow (Visibility is 9 on entry #3)

Entry #5
Amplification of Weather

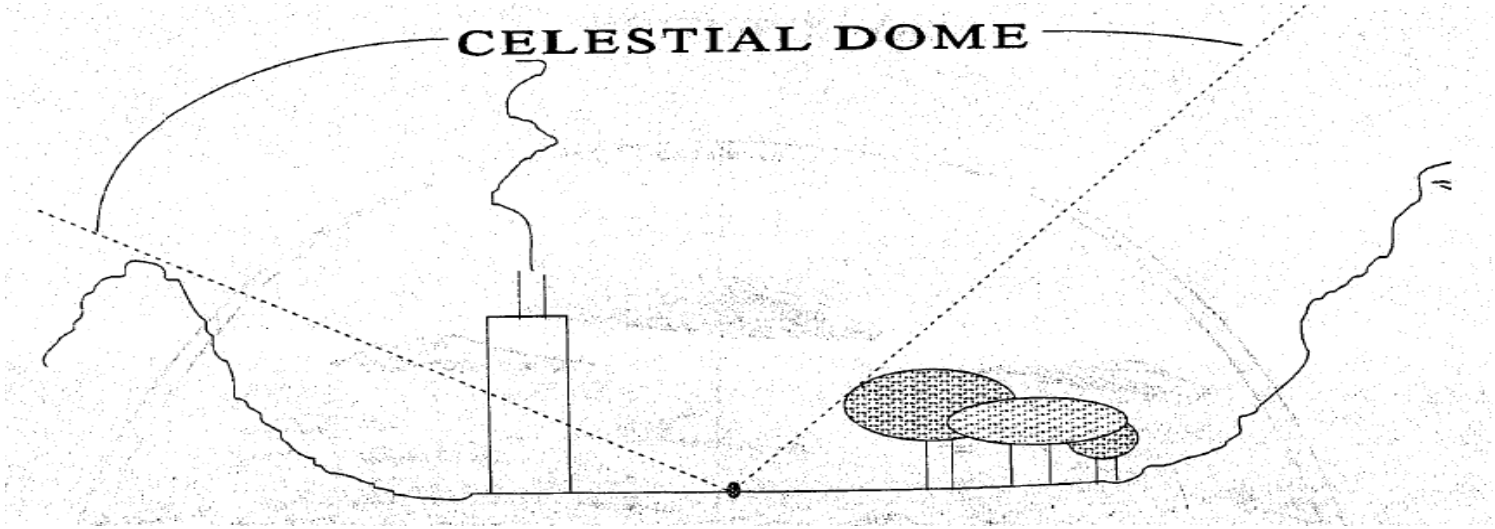
Amplification of Present Weather and Obstructions
(Only if there is an entry in #5)

Code Digit #5	
0	NONE
1	Light Ice Pellets (visibility not restricted) (Rare event)
2	Moderate Ice Pellets (Visibility Reduced to < 7 Mile to 3 Mile (4800 to 9000m)
3	Heavy Ice Pellets (Vis reduced by Ice Pellets to < 3 SM (<4800 meters)
4	Light Snow (Visibility greater than 1/2 Mile)
5	Moderate Snow (Visibility Greater than 1/4 Mile but less than 1/2 Mile)
6	Heavy Snow (Visibility of less than 1/4 Mile)

Sky Condition

- There are two elements to observing sky condition: (Entry 6, 6B and 6C)
  - Sky Cover - The amount total coverage and the amount of cloud cover for each layer
  - Cloud Height - The cloud base height for each existing layer

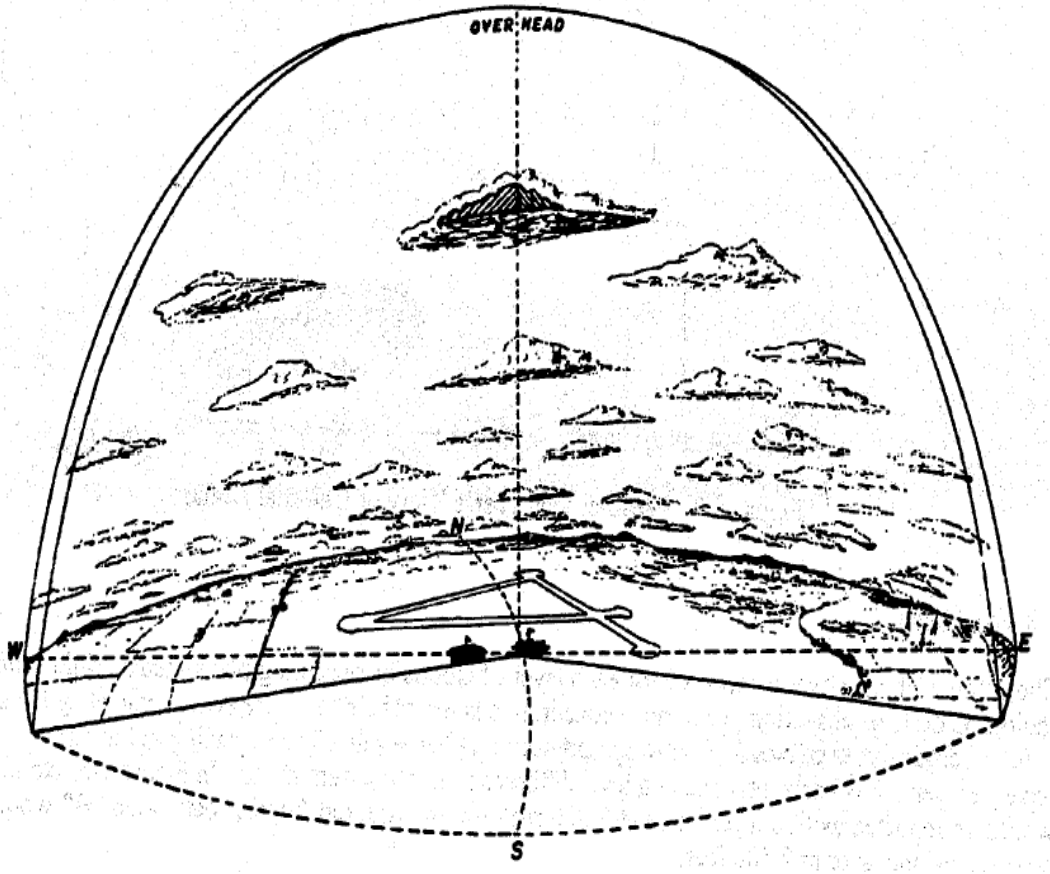
Sky Condition



- Sky condition is a description of the appearance of the sky (celestial dome) as seen from the observing location.
- The celestial dome is that part of the sky that would be visible above all natural obstructions (hills, rock) if man-made obstructions (buildings) were not present.

Sky Condition

- While it is convenient to represent sky cover in some graphic form, the observer actually works with a huge dome of sky. Clouds near the horizon appear to be lower, more numerous, and closer together.



Sky Cover Reportable Values

Reportable Sky Cover		
Reportable Contractions	**Meaning**	**Summation Amount**
SKC	**Sk**y **C**lear	0
FEW	FEW	less than 1/8 to 2/8
SCT	**SC**a**T**tered	3/8 to 4/8
BKN	**B**ro**K**e**N**	5/8 to less than 8/8
OVC	**OV**er**C**ast	8/8

- Report cover for each layer based on the reportable values in the above chart.

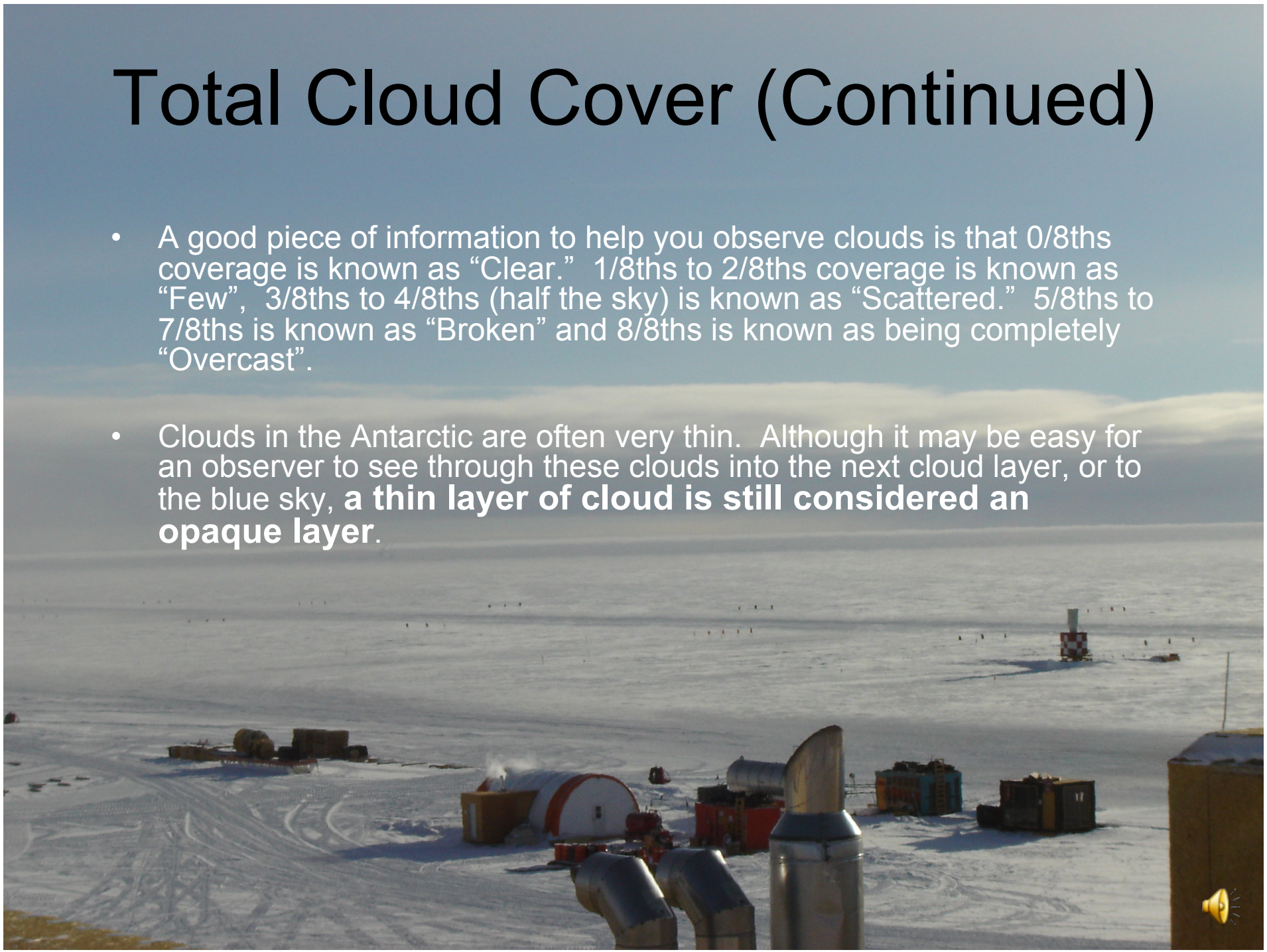
Total Cloud Cover – A Measure of Sky Condition

- Measuring total cloud cover (How much of the sky is covered by clouds) can be one of the most challenging tasks for a new weather observer. Along with cloud height, cloud cover can vary depending on an observer's perspective, however, station consistency is of the utmost importance.
- Cloud cover is measured in what is called Oktas (Eighths). This is measured by mentally viewing the sky as a pie cut into eight pieces.
- The lowest amount of Oktas an observer may code is zero Oktas (0/8ths). The most is eight oktas (8/8ths).
- 0/8ths may only be coded when there is NO clouds in the sky. If there is even a single "poof" of cloud in the sky, the observer codes 1/8ths coverage.
- 8/8ths may only be coded when there is a complete overcast. If an observer notes any breaks in an "overcast" layer, than that layer will be reported as 7/8ths coverage.

Total Cloud Cover (Continued)

- A good piece of information to help you observe clouds is that 0/8ths coverage is known as “Clear.” 1/8ths to 2/8ths coverage is known as “Few”, 3/8ths to 4/8ths (half the sky) is known as “Scattered.” 5/8ths to 7/8ths is known as “Broken” and 8/8ths is known as being completely “Overcast”.

- Clouds in the Antarctic are often very thin. Although it may be easy for an observer to see through these clouds into the next cloud layer, or to the blue sky, **a thin layer of cloud is still considered an opaque layer**.



Sky Cover with Multiple Layers

- Determining amount of sky cover with multiple layers:
  - Sky cover for a layer is the total of the sky hidden by any surface based layer plus the amount of sky covered by all layers up to and including the layer being evaluated.
  - Always start totaling sky cover from the lowest layer.
  - As each layer above is evaluated, the amount determined must be equal to or greater then the previously evaluated lower layer.
- Example: If sky completely covered by four layers, and each layer were 2/8, sky cover for each layer would be:
  - First layer (lowest) 2/8 sky cover
  - Second layer 4/8 sky cover
  - Third layer 6/8 sky cover
  - Fourth layer 8/8 sky cover
- Note that the highest layer is considered to be 8/8 even though by itself it is only 2/8.

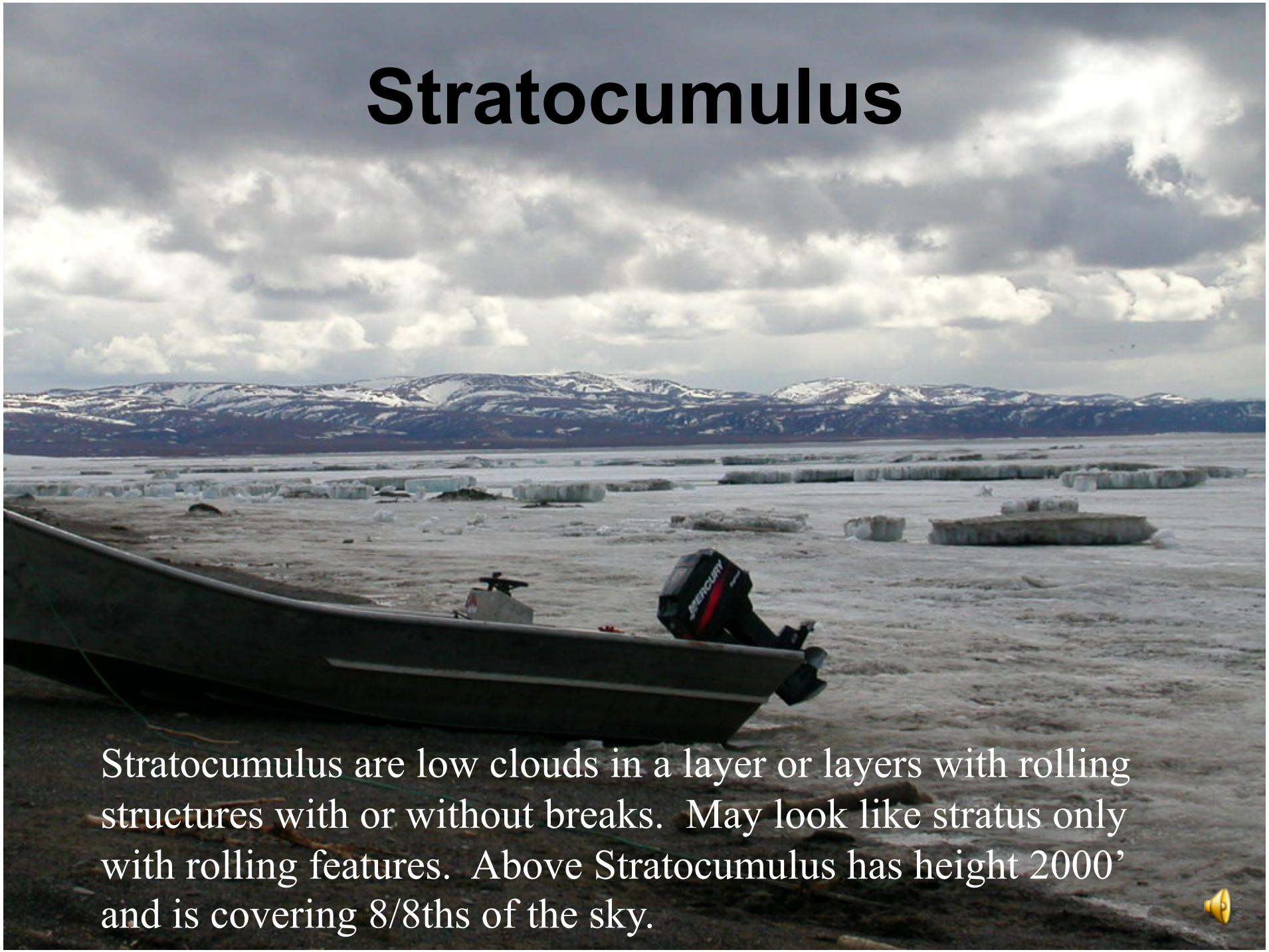
Low Level Clouds

- Low – normally surface to 5,000 feet in the polar regions.
  - Stratus: appear as a grey, shapeless sheet of cloud extending in all directions across the sky, look like a layer of fog that never reaches the ground, based less than 1,500 feet above ground.
  - Stratocumulus: low clouds with a lumpy, rounded appearance with some blue sky between them, base is typically at 1,000-5,000 ft.
  - Cumulus: puffy and often have very distinct edges and usually a noticeable vertical development. They often have a popcorn-like appearance. Cells can be rather isolated or they can be grouped together in clusters.

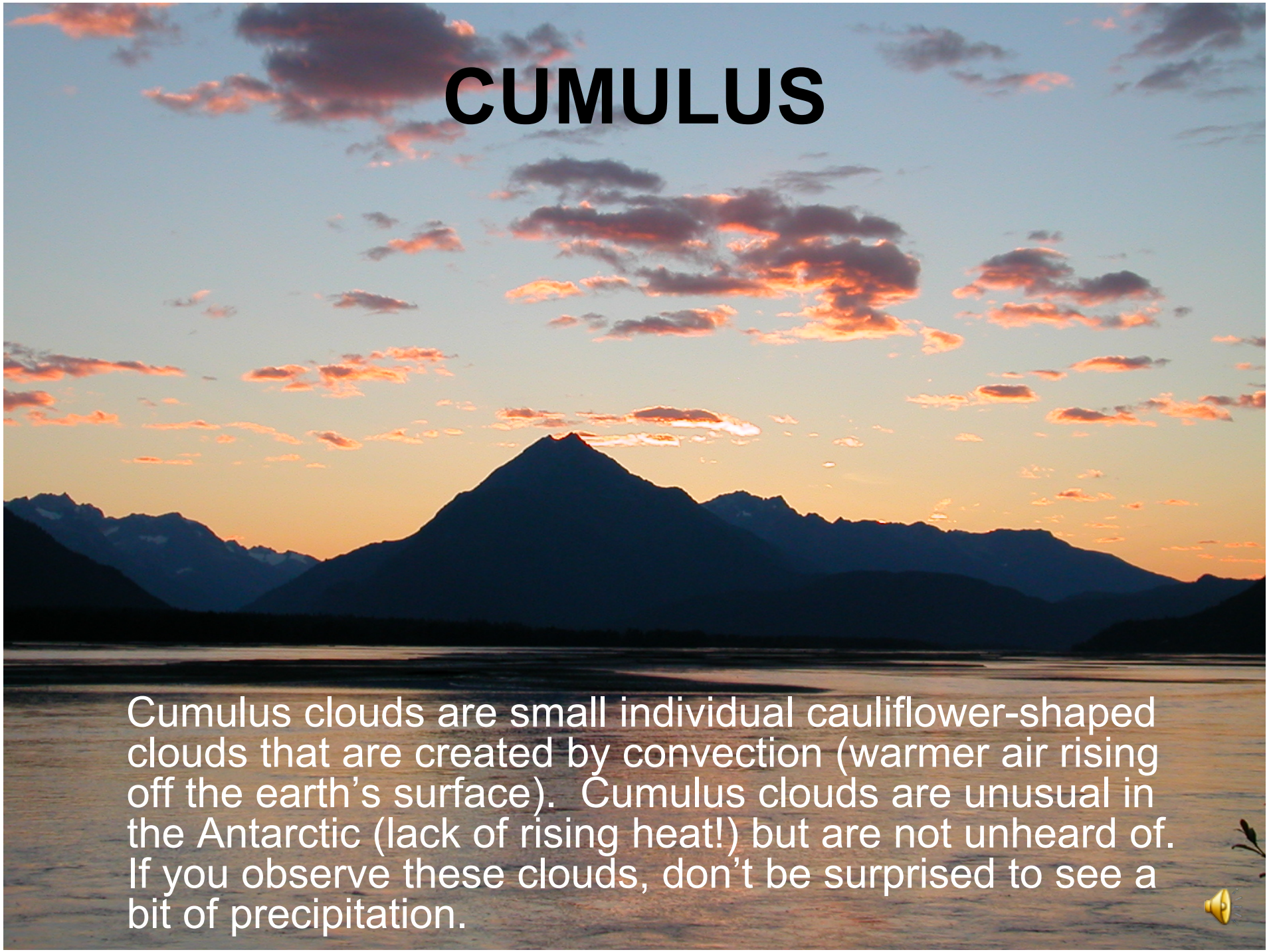
STRATUS

Low flat cloud without any "rolling" features. Cloud is sometimes thin enough to see the sun, although dimly. Stratus may produce light precipitation although heavier precipitation may fall through the cloud from unseen higher cloud layer. Note the speed at which low stratus takes over the sky: Above photo with red and white tower was taken at 2200Z (2/8ths cloud coverage) and photo with Twin Otter, taken at the same location, was photographed at 2300Z and sky is completely overcast. Instrumentation confirmed cloud base to be at 1000'.

Stratocumulus



Stratocumulus are low clouds in a layer or layers with rolling structures with or without breaks. May look like stratus only with rolling features. Above Stratocumulus has height 2000' and is covering 8/8ths of the sky.


CUMULUS
Cumulus clouds are small individual cauliflower-shaped clouds that are created by convection (warmer air rising off the earth's surface). Cumulus clouds are unusual in the Antarctic (lack of rising heat!) but are not unheard of. If you observe these clouds, don't be surprised to see a bit of precipitation.

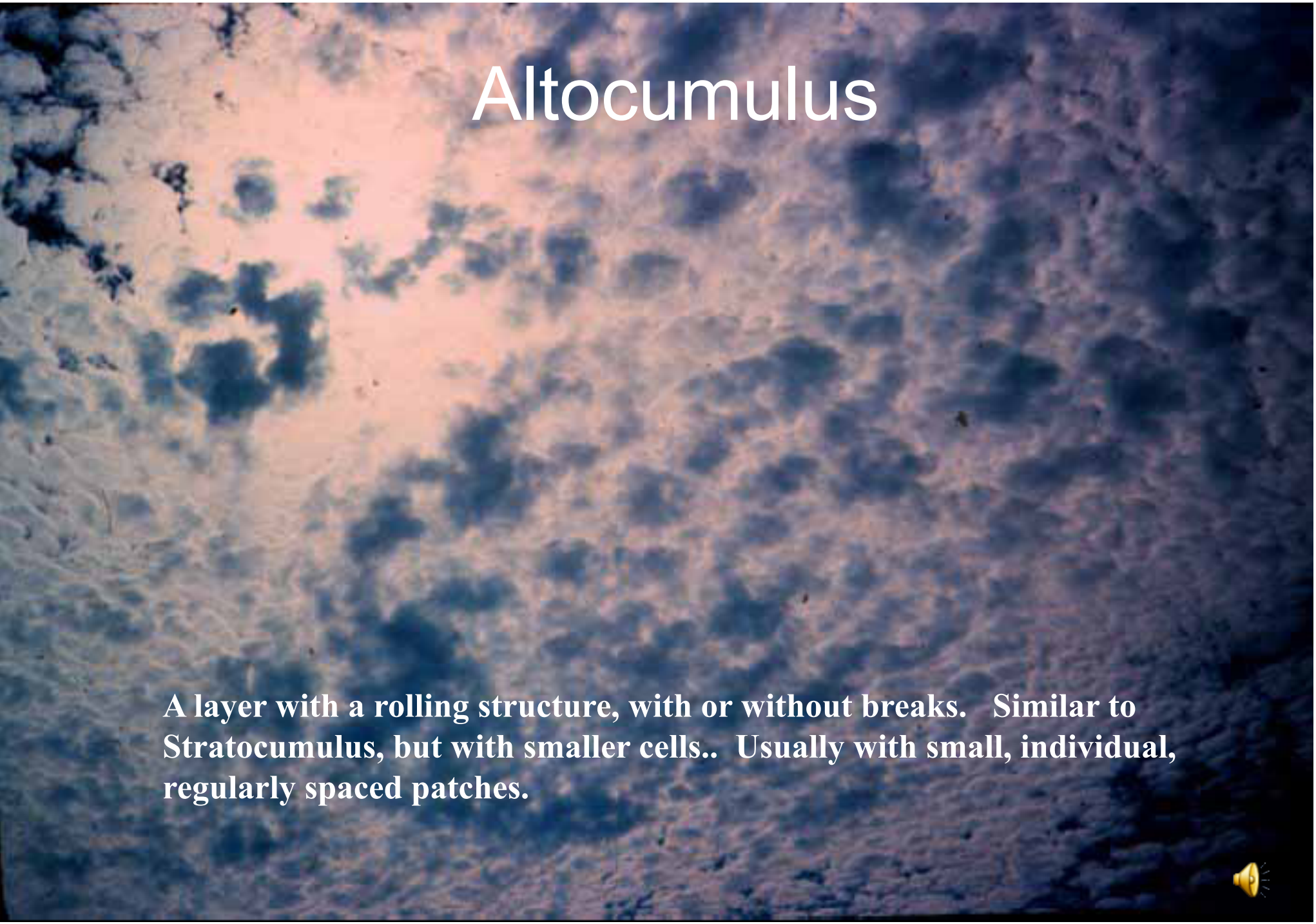
Middle Clouds

- Middle Clouds – normally between 4,000 and 9,000 feet in the polar regions.
  - Altostratus: mostly flat, uniform sheet of cloud; sun may be visible under thinner sections of the cloud as a dim round disk.

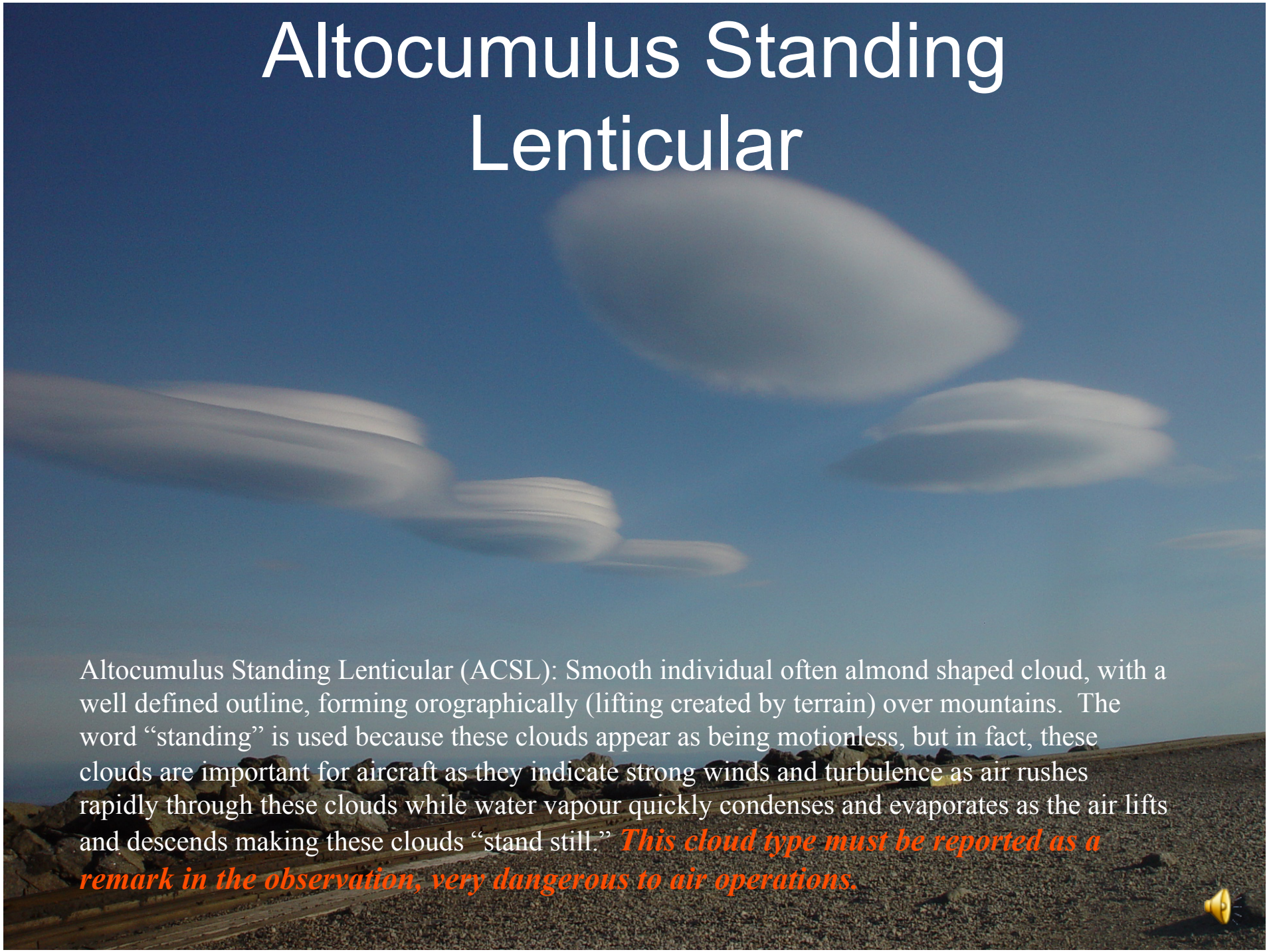
  - Altocumulus: appear as gray or white, puffy blobs, sometimes rolled out in parallel waves or bands. One part of the cloud is usually darker than the rest, which helps distinguish this cloud from the higher cirrocumulus clouds. Altocumulus clouds can look like "little castles" in the sky.

MID-LEVEL CLOUDS

- Mid level clouds often take on the same characteristics as low level clouds only with smaller features.
- Altostratus are flat like stratus clouds only a bit thinner and will appear to move more slowly.
- Altocumulus clouds will look identical to stratocumulus except for one distinctive difference: the rolling undulations of this cloud will appear smaller than the stratiform clouds that form closer to the observer.
- In mountainous regions, an observer must pay careful attention to the formation of lenticular clouds. Lenticular clouds are a form of Altocumulus, but they have sharp, round smooth edges and these clouds are often likened to “flying saucers.” These distinct clouds are important to aviation because they often indicate strong winds and severe turbulence at the mid-levels.


Altocumulus
A layer with a rolling structure, with or without breaks. Similar to Stratocumulus, but with smaller cells.. Usually with small, individual, regularly spaced patches.

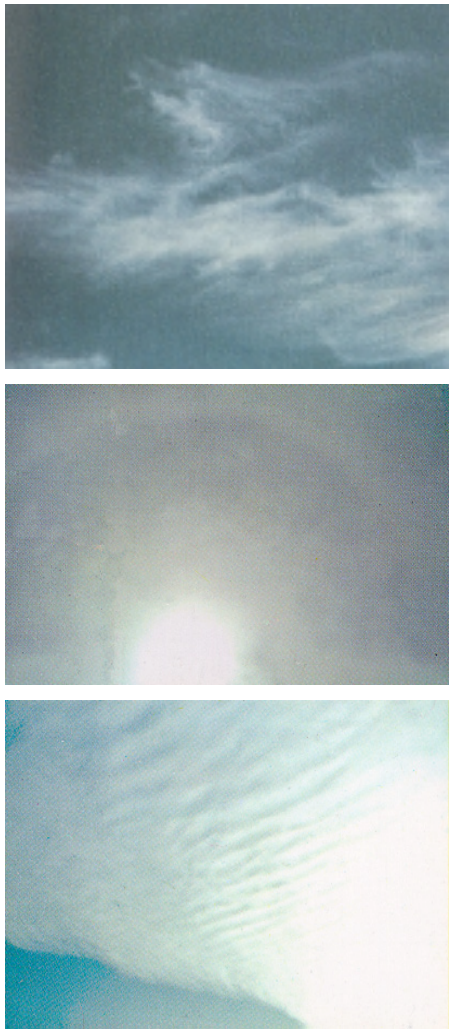
Altocumulus Standing Lenticular



Altocumulus Standing Lenticular (ACSL): Smooth individual often almond shaped cloud, with a well defined outline, forming orographically (lifting created by terrain) over mountains. The word “standing” is used because these clouds appear as being motionless, but in fact, these clouds are important for aircraft as they indicate strong winds and turbulence as air rushes rapidly through these clouds while water vapour quickly condenses and evaporates as the air lifts and descends making these clouds “stand still.” ***This cloud type must be reported as a remark in the observation, very dangerous to air operations.***

High Clouds

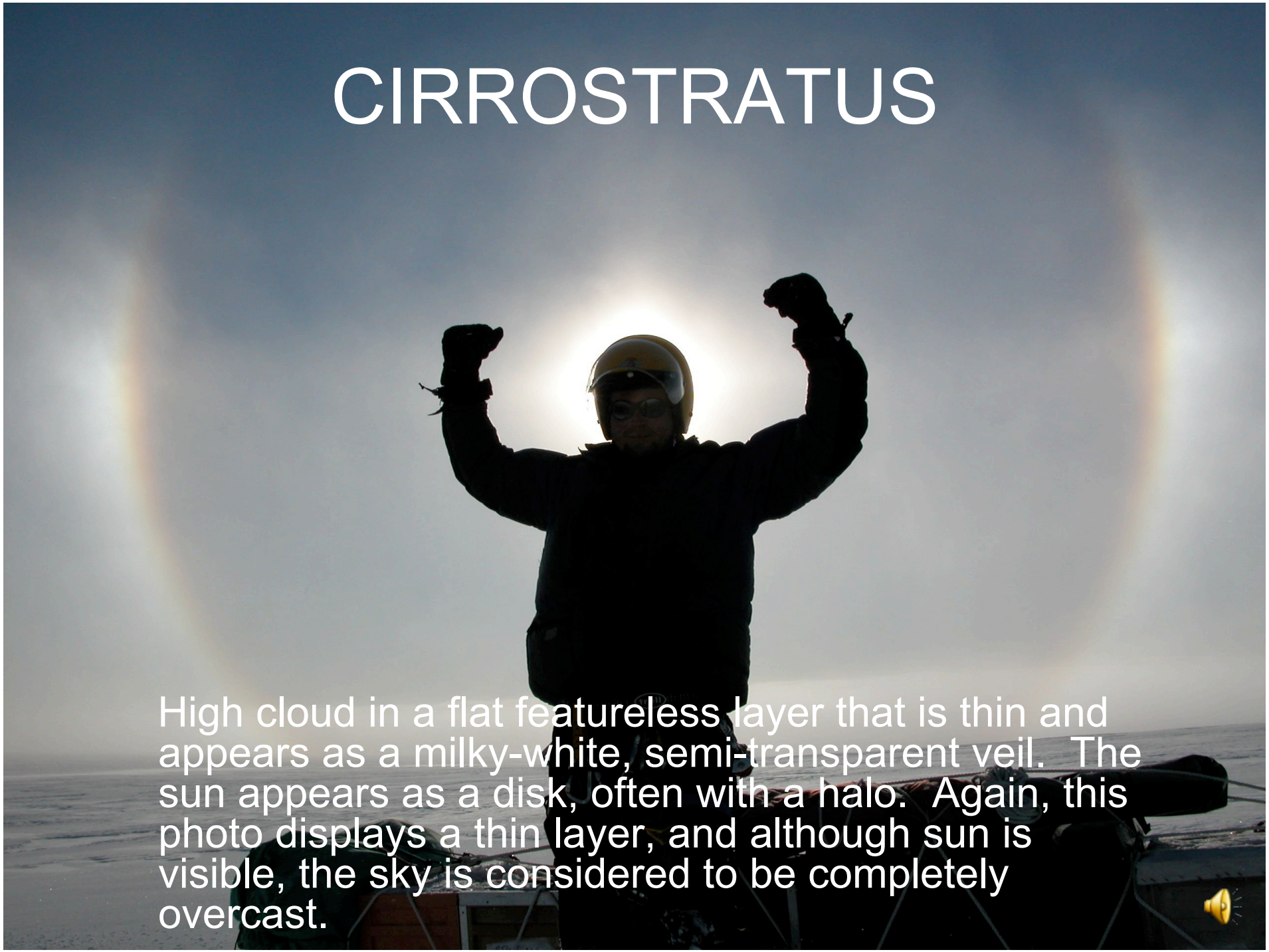
- High – range from 9,000 to 18,000 feet in the polar regions.
  - Cirrus: Cirrus clouds are very wispy and feathery looking. They form relatively high in the atmosphere. Cirrus clouds are composed of ice crystals and are so thin that sunlight can pass right through them.
  - Cirrostratus: Ice clouds in a uniform sheet, still thin.
  - Cirrocumulus: small, rounded white puffs that are isolated or in long rows. When the white puffs are in rows, they give the cloud a rippling appearance that distinguishes it from a cirrus or a cirrostratus cloud. Cirrocumulus clouds rarely cover the entire sky and are sometimes hard to detect.



CIRRUS

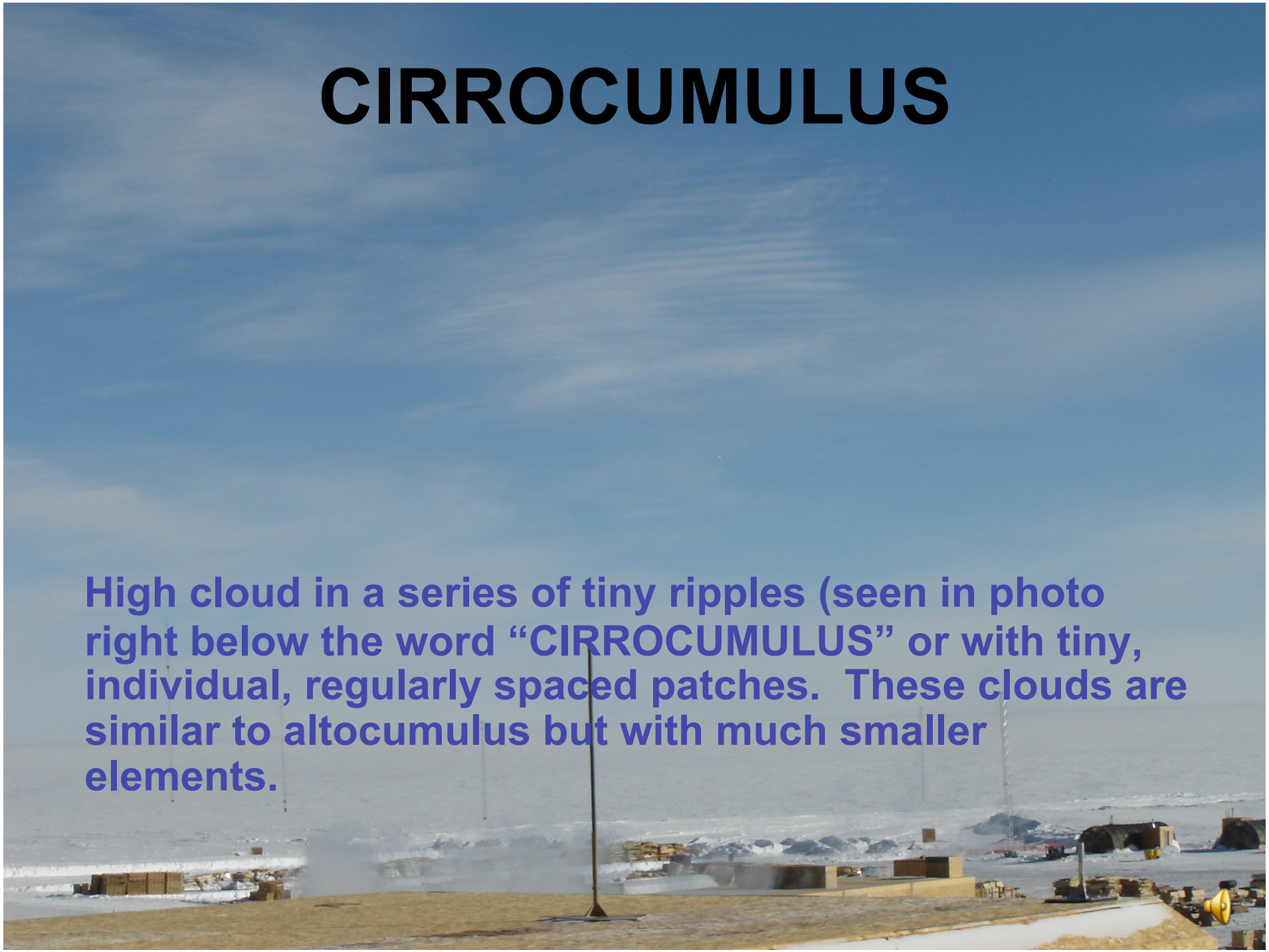
Fibrous (hair-like) clouds of ice in the shape of filaments, bands or hooks. Take notice how clouds the left are quite thin. Although you can see through these clouds, in observing they count just the same as thicker clouds. Clouds are covering 7 oktas of the sky in both of these photos.

CIRROSTRATUS



High cloud in a flat featureless layer that is thin and appears as a milky-white, semi-transparent veil. The sun appears as a disk, often with a halo. Again, this photo displays a thin layer, and although sun is visible, the sky is considered to be completely overcast.

CIRROCUMULUS



High cloud in a series of tiny ripples (seen in photo right below the word "CIRROCUMULUS" or with tiny, individual, regularly spaced patches. These clouds are similar to altocumulus but with much smaller elements.

Determining Cloud Heights by Cloud Type

(These are general rule-of-thumb, i.e. not set in stone; depends on station elevation and temperature.)

- Three cloud levels:
  - High – 9,000 to 18,000 feet (above station)
    - Cirrus, Cirrostratus, Cirrocumulus
  - Mid – normally 4,000 to 9,000 feet
    - Altostratus, Altocumulus
  - Low – normally surface to 4,000 feet
    - Stratus, Stratocumulus, Cumulus

Entry #6
Clouds

CLOUD HEIGHT of FIRST LAYER (Lowest Layer)

The Height is Reported in FEET ABOVE GROUND LEVEL (AGL)

SFC-5000ft=nearest 100ft **>5000 to <10,000=nearest 500ft**

>10,000=nearest 1000ft

500 Feet = 005 **1000 Feet = 010** **5000 Feet = 050** **10,000 Feet = 100**

Amount coded as Few, Scattered, Broken or Overcast

e.g. FEW005, SCT010, BKN080, OVC150

2/8 + 2/8 + 2/8 + 2/8 = 8/8 OVC

CLR **No clouds at all in the sky**

6B Second Layer

Code digit 6B **Second Cloud Layer**

IF NEEDED

CLOUD HEIGHT of Second LAYER

The Height is Reported in FEET ABOVE GROUND LEVEL (AGL)

SFC-5000ft=nearest 100ft **>5000-<10,000=nearest 500ft**

>10,000=nearest 1000ft

500 Feet = 005 **1000 Feet = 010** **5000 Feet = 050** **10,000 Feet = 100**

Amount coded as Few, Scattered, Broken or Overcast

e.g. SCT005, SCT110, BKN080, OVC050

6C Third Layer

Code Digit 6C

Third Cloud Layer

IF NEEDED

CLOUD HEIGHT of Third LAYER

The Height is Reported in FEET ABOVE GROUND LEVEL (AGL)

SFC-5000ft=nearest 100ft **>5000-<10,000=nearest 500ft**

>10,000=nearest 1000ft

500 Feet = 005 **1000 Feet = 010** **5000 Feet = 050** **10,000 Feet = 100**

Amount coded as Few, Scattered, Broken or Overcast

e.g. FEW005, SCT110, BKN080, OVC050

Entry #7
TOTAL Sky Condition

Code Digit #7	SKY CONDITION TOTAL OF ALL LAYERS
0	**CLEAR SKY**
1	**1/8 coverage**
2	**2/8 coverage**
3	**3/8 coverage**
4	**4/8 coverage**
5	**5/8 coverage**
6	**6/8 coverage**
7	**7/8 coverage**
8	**8/8 coverage**
9	**Total Obscuration (In the Fog, no sky visible)**

Entry #8
Temperature and Dewpoint

- Read directly from the Kestrel
- Always reported in the nearest whole degree Celsius
- Minus temperatures are recorded with an “M” prior to the temperature (M06)
- Dewpoint is read directly from the Kestrel and reported in the same way as the temperature
- Dewpoint will never be higher than your temperature

Entry #9
Barometric Pressure

- You will be reporting Station Pressure and not Altimeter
- Station Pressure is the atmospheric pressure at the designated station elevation
- Read directly from the Kestrel
- Report in inches of mercury to the nearest 1hundreth of an inch.

Entry #10
Remarks

- Any remarks that you feel are operationally significant to your location
- Weather in the distant, events not covered in other entries, etc.
- Plain language, no code needed

Thank you for providing this important information.