Annex II

The International Cloud Atlas: Candidate Image Submission

This document provides a brief introduction, and hints for image submission.

Introduction

The ICA has a long and rich history. Its first edition was published in 1939, though its origins date back to the 1800s. Subsequent editions were published in 1956 and 1975, with the most recent edition of Volume II, containing more than 200 photographic images of clouds and meteors, published in 1987.

Since 1987, much in the world has changed. In particular, we can now take advantage of the many high quality images from ubiquitous modern cameras, and we can use the power of the internet to make the ICA more flexible and complete.

So it is time, again, to revise and update the ICA. For this purpose we are seeking new, colour, high resolution imagery of clouds and other meteors.

WMO invites you to submit candidate imagery for the new edition of the ICA.

After registering yourself on the ICA Image Submission Website at http://wmoica.org/index.php/en/ (help with this is available in Annex I or under the "Help" pull-down), simply select the "Submit Photo" or "Submit Time-lapse/video/animation", or use the Submit New Imagery pull-down to submit your photographs or videos, and associated metadata, for consideration by WMO.

Required and Requested information

One of the aims of the submission site is to acquire as much information on the submitted photo as possible. Therefore a submitted photo or video with required information and a complete or almost complete list of additionally requested information is more likely to be selected for publication than one without. **Table 1** describes the information sought.

What are we seeking in particular?

In all, there are more than 150 classifications of cloud types and other meteors. (You can learn more about these by consulting Volume I of the current edition of the ICA, available under the Links pull-down.) Some are very common, so we are likely to receive many candidates. On the other hand, some are very rarely seen and these are the images we most need for the new ICA. Images of these rarer clouds and meteors are more likely to be selected for publication. To give you an idea of the **'Most Wanted Lists'**, see **Tables 2 and 3**. The first table refers to still images, and the second to video, time-lapse or sequences. Again, it may help you to consult Volume I of the ICA to learn what some of the terms mean.

Things to Note

1) All imagery must be in colour and of high resolution. Either photographs or video / time lapse photography can be submitted, but there are upper and lower size limits.

2) You must be the author of the imagery and you must give WMO permission to use the imagery as it wishes. You can do this by clicking on the Accept Terms and Conditions icon on the submission page.

3) **If submitting metadata imagery, please ensure that you provide full contact details for the copyright owner**, so that WMO can seek permission should we wish to publish these files in the ICA

4) Some information items are mandatory and others are optional. The full list of desired Metadata is listed in **Table 1**.

5) **Before entering any information, please read the instructions accompanying each input carefully.**

Estimated time of input for cloud photos and videos

(i) Submission of a photo with only required metadata (top part of **Table 1**) should take approximately 10 minutes.

(ii) Submission of a photo with mandatory required **and** a full or near full set of other requested metadata (lower part of **Table 1**), is estimated to take 30 minutes.

When submitting (ii) above, it is recommended that you compile all the information in one folder/file first, including Synoptic charts and Atmospheric soundings, before proceeding with your upload.

Note of caution

Photos that are not of high quality and for which the metadata are not geographically and/or meteorologically correct, are unlikely to be selected for publication in the International Cloud Atlas.

THANK YOU for taking the time to read this introductory guidance material, and thank you for submitting your imagery for consideration.

Table 1: Required and other requested information with each submission

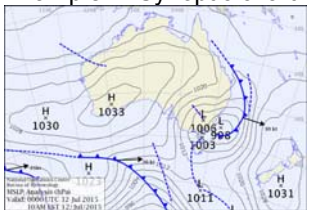
Required information
• Observation date and time
• Location name, latitude and longitude (map entry tool available)
• Climate Classification (Koppen scheme ; map entry available)
• Type of location (land/sea or air)
• Camera pointing direction
• Meteor type (e.g. clouds, lithometers, etc.)
• Cloud Genera (e.g. Cirrocumulus, unknown, etc.)

Other requested information
• If entry is one of the main cloud types: Cloud Genera, Species, and Variety (e.g. Stratocumulus, Stratiformis, Opacus) Cloud supplementary feature and accessory clouds (e.g. Mamma) Mother clouds (e.g. genitus Altostratus (asgen) and/or mutatus Stratus (stmut))
• If entry is a special cloud or other feature: Identify type of stratospheric, mesospheric, or other cloud (e.g. Type II polar stratospheric cloud); or Identify feature associated with severe convective weather or other feature (e.g. Beaver's Tail or Funnel cloud)
• If entry is a meteor other than cloud (hydrometeor, lithometeor, photometeor, or electrometeor): Identify lithometer type and detail (e.g. fog, snow pellets, sandstorm, greem flash, Sain Elmo's fire, etc.)
• Image title (e.g. Altostratus translucidus)
• Image and weather description, and synoptic code See Image Description Guide in Help pull-down. Example: "The major part of this layer of Altostratus is sufficiently thin to reveal the position of the sun (variety translucidus). An occlusion was present 150 km to the west, moving eastward in a general easterly flow. CL = 0 CM = 2 CH = /)"
• Photographic metadata (e.g. Wide angle)
• Atmospheric stability (e.g. Middle level instability)
• Air Temperature, Dew Point, Relative Humidity
• Cloud amount (e.g. 7/8), Height of cloud base (and estimated or measured)
• Visibility in general terms and estimated visibility

- Supplementary files: synoptic chart, upper-air sounding, radar imagery, satellite imagery, ground-based remote sensing, time-lapse/video (associated with the main entry)

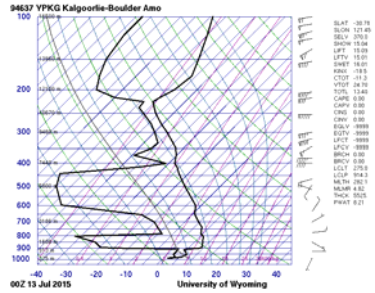
- For each supplementary file provided further information is also requested: General description, date and time, copyright owner, owner contact details, URL, details to obtain ownership rights or license to publish.

Example 1: Synoptic chart



General description: The area is under the stable influence of a slow moving high pressure system
Date and time: 12 July 2015 0900 LT
Copyright owner: Australian Bureau of Meteorology
Contact details: GPO Box 1289 Melbourne 3001
Chart URL: http://www.bom.gov.au/australia/charts/synoptic_col.shtml
Details of rights or license to publish (if obtained): N/A

Example 2: Upper Air Sounding



General description: The low level is dominated by a strengthening subsidence inversion at 900 hPa. Mid levels are dry. High level moisture confirms the identification of Cirrocumulus, rather than Altocumulus.
Date and time: 13 July 2015 0800 LT
Copyright owner: University of Wyoming
Contact details: University of Wyoming, Atmospheric Science, Dept. 3038, 1000 E. University Ave. Laramie, WY 82071
Sounding URL:
http://weather.uwyo.edu/cgibin/sounding?region=pac&TYPE=GIF%3ASKEWT&YEAR=2015&MONTH=07&FROM=1300&TO=1300&STNM=94637
Details of rights or license to publish (if obtained): N/A

Table 2: "Most Wanted" (rarer) Images

Cloud	Description	Comment
Cirrus castellanus	Fairly dense Cirrus, in the form of small, rounded and fibrous turrets or masses rising from a common base	Infrequently photographed
Cirrus cirrocumulogenitus	Cirrus evolving from the virga of Cirrocumulus	Infrequently photographed
Cirrus cirrostratomutatus	Cirrus formed by sublimation of thinner parts of a non uniform layer of Cirrostratus	Identification possible in a single image; sequence of images preferable
Cirrus spissatus cumulonimbogenitus	Cirrus spissatus originating from upper part of a Cumulonimbus	Köppen climate zones D/E
Cirrus cumulogenitus	Cirrus forming at very low temperatures from Cumulus congestus	Köppen climate zones D/E
Cirrus virga rainbow	Virga has melted and a rainbow is visible in the water droplets	Not to be confused with a circumhorizontal arc
Cirrus with partial halo	Partial halo in the form of an arc. Can be whitish but usually coloured with faint red on the inside of the arc and faint violet on the outside.	Not a full circle halo due to small horizontal extent or narrowness of Cirrus elements

Cirrocumulus lenticularis	Patches shaped like lenses or almonds, elongated and with well-defined outlines	Patches have ripples or very small grains. Not commonly observed
Cirrocumulus lenticularis with irisation	Patches shaped like lenses or almonds, elongated and with well-defined outlines and with irisation	Patches have ripples or very small grains. Not commonly observed
Cirrocumulus castellanus	Elements extending vertically in the form of small turrets, rising from a common horizontal base	Easiest observed side on; this is difficult due height of the cloud and size of the elements
Cirrocumulus floccus	Very small cumuliform tufts with ragged lower parts	Height and size of Cirrocumulus makes it difficult to observe difference between “very small tufts” and “very small elements in the form of grains”
Cirrocumulus castellanus (or floccus) with virga	Small virga – little vertical extent	Difficult to observe Cc cas and Cc flo with or without virga
Cirrocumulus mamma	Inverted mounds (like udders) on the under surface.	Best observed at sunrise/sunset with side-on profile
Cirrostratus duplicatus	Cirrostratus arranged in superposed sheets or layers, at slightly different levels, sometimes partly merged	Difficult to observe other than at sunrise/sunset where colour may reveal presence. Not often observed.
Cirrostratus undulatus	Cirrostratus showing undulations	Often confused with Cirrocumulus undulatus
Cirrus (often in bands) and Cirrostratus; progressively invading the sky	Veil of Cirrostratus with Cirrus fibratus and/or Cirrus uncinus on the leading edge.	Occurs quite frequently but not often photographed. Synoptic code C_H5 (leading edge of Cs ≤ 45° above horizon) and C_H6 (leading edge > 45° above horizon)
Altocumulus of a chaotic sky	Chaotic, heavy and stagnant sky with many broken sheets at the same or different levels, of ill defined forms of Altocumulus and even Altostratus translucidus fibratus. Low and high étage clouds are usually present.	Often seen on the rear edge of a line of thunderstorms. One of the most infrequently photographed of all the synoptic cloud types. Synoptic code C_M9
Altostratus duplicatus	Two or more superposed layers, at slightly different levels, sometimes partly merged	Sheets or layers of As where one or both start to break up into patches. The patches are still much larger than Ac patches. Rarely occurs.
Nimbostratus	Grey often-dark cloud layer. Thick enough throughout to blot out the sun.	Rarely photographed due rain and low light. Distinction of the most incorrectly identified of all clouds.
Nimbostratus cumulogenitus	Spreading out of Cumulus into a rain bearing layer of Ns	Extremely rare event

Stratocumulus mamma	Stratocumulus has inverted mounds (like udders) on the under surface.	Infrequently photographed
Stratus undulatus	Stratus patch, sheet or layer with undulations	Occurs infrequently and not to be confused with thick layer of Stratocumulus with undulations
Stratus praecipitatio	Stratus precipitating: 1. drizzle; 2. snow; 3. snow grains	Rarely photographed due wet conditions and low light.
Stratus with halo	Stratus consisting of small ice particles can produce halos	Köppen climate zones D/E and colder parts of C
Cumulus arcus	Dense, horizontal roll attached to the lower front part of Cumulus, most likely of the species congestus	Rare event; arcus most frequently associated with Cumulonimbus
Cumulus tuba	Column or inverted cone (funnel cloud) protruding from the cloud base. Usually weak (quite spindly) when associated with Cumulus congestus.	Most images are zoomed in on the tuba. The whole cloud should be in the field of view to confirm identification of Cumulus rather than Cumulonimbus. Take wide angle then zoom for tuba.
Cumulonimbus capillatus without incus	Cumulonimbus where upper part has clearly started to freeze, evidenced by lack of sharp outlines and fibrous, fuzzy or striated structure. The upper part has not spread out in the shape of an anvil	Cumulonimbus where the top has not yet spread yet into an anvil (or decays before spreading into an anvil)
Roll clouds	A long, usually low, horizontal, detached, tube-shaped cloud mass, often appearing to roll slowly about a horizontal axis. Infrequently seen in the middle étage.	The 'Morning Glory' that forms in the Gulf of Carpentaria, Australia is a low étage roll cloud Roll clouds are not to be confused with arcus. See Cumulus arcus above.
Clouds from waterfalls	Spray saturates air and cloud forms, usually in the form of Cumulus. Brilliant rainbows often present.	Most often with high waterfalls and/or waterfalls with a large rate of flow. Not to be confused with cloud spilling over the edge of a waterfall.
Clouds formed above forests	Locally formed Stratus and Cumulus clouds above a forest due evapotranspiration from the forest canopy.	More frequent with wet forests and rain forests. Not to be confused with cloud forming due orographic ascent of moist air in forested elevated areas
Clouds from fires	Cumulus congestus and Cumulonimbus formed above forest and large industrial fires.	Cumulus can form above thermals from grassland fires where there may be little smoke

Clouds from volcanic eruptions	Strongly developed and rapidly growing cumuliform clouds. May spread out at a high altitude over vast areas. Can have spectacular lightning displays.	Clouds from volcanic eruptions composed mainly of dust particles or other solid particles of different sizes. Some parts can consist almost entirely of water droplets and sometimes precipitate.
Clouds from industry	Examples are clouds of smoke and steam in industrial areas, smoke clouds created for frost protection purposes, clouds of insecticide gas or powders in agricultural areas.	
Clouds from explosions	Clouds of smoke and dust formed by large explosions. Velum and pileus often observed above the clouds.	
Curls/breaking wave/billow clouds	Commonly known to as Kelvin Helmholtz waves. Vary in appearance from a standing to a breaking ocean wave.	Occur in low, middle and high étages.
Meteors other than Clouds	**Description**	**Comment**
Drifting or blowing snow	Drifting snow raised to less than 1.8m by the wind. Blowing snow raised to moderate or great heights by the wind.	Drifting snow does not reduce vertical or horizontal visibility.
Drifting dust or sand	Dust or sand raised to less than 1.8 m and drifting parallel to the ground.	Objects below 1.8 min height are veiled or hidden by dust or sand.
Blowing dust or sand	Dust or sand raised to moderate heights above the ground.	Dust or sand may veil the sky and even the sun. Not to be confused for a dust storm or sandstorm where dust or sand is carried to great height by strong and turbulent wind.
Spray	Water droplets torn by the wind from the surface of an extensive body of water.	Variations include spray that freezes on impact with objects and moving vortices of spray in strong gales
Upper atmospheric lightning (Transient Luminous Events)	Blue jets: lightning from cloud top toward outer space. Extend from a few to 40 and rarely 80 kilometers in size. Red sprites; large, very brief, and often well structured bursts of light 40 to 80 km above thunderstorms. Upper part has a red glow and lower part can have blue streamers. Elves: rapidly expanding rings of predominantly red light centered along the lower edge of the ionosphere (80-90 km) above active thunderstorms. Last about a millisecond in which they can expand to a diameter of 300 km.	Must be dark, eyes fully adjusted to the dark, Cumulonimbus tops on horizon and little intervening cloud cover. Blue jets occur in less than 1/10 second – difficult but possible to see with the human eye. Red sprites occur in a few to tens of milliseconds. So brief the flash is almost at the limit of human eye perceptibility.

		Elves are too brief to see with the human eye and difficult to catch on standard 30 fps video cameras.
Saint Elmo's Fire	An electrical discharge emanating from elevated objects at the Earth's surface or aircraft in flight.	Appears as a glowing ball of violet or greenish fluorescent light when emanating from pointed objects such as lightning conductors and ship's masts.
Green Flash	A predominantly green and rapid display, often a flash, on the extreme upper edge of the sun, moon, or sometimes even a planet when disappearing below or appearing above the horizon.	Can be a blue and/or violet when the air is very transparent. Usually seen when the horizon is clearly visible, rarely when the sun disappears behind mountains, a cloud bank or even the roof of a building
Upper (superior) mirage	Image of object appears above the actual object. When objects appear to float above the horizon, objects beyond the horizon may come into view.	Occur over snow and ice and other cold land and sea surfaces.
Lower (inferior) Mirage and Shimmer	The elusive body of water in the distance on a hot sunny day is a lower mirage. The hazy appearance of the air heated by the bitumen road is shimmer.	Lower mirages can make distant objects appear larger vertically and/or horizontally. Shimmer gives objects a blurred shimmering appearance.
Scintillation	Rapid pulsing variations of light from celestial bodies; visible at night.	More pronounced near the horizon than overhead due slant angle depth of atmosphere.

Table 3: “Most Wanted” (rarer) Time lapse or sequence of still images

Cloud	Description	Comment
Cirrus and lower clouds at sunrise or sunset	Change in colour of clouds at different heights as they lose/gain sunlight	Identifies multiple layers of clouds
Cirrostratus cirromutatus	Merging of elements of Cirrus into Cirrostratus	May be discernable in time lapse
Cirrostratus cirrocumulosmutatus	Merging of elements of Cirrocumulus into Cirrostratus	May be discernable in time lapse
Cirrostratus cirrocumulosmutatus	Thinning of Altostratus and transforming into a low layer of Cirrostratus	Rare event. Not to be confused with Altostratus thinning to reveal Cirrostratus
Cirrocumulus cirromutatus	Transformation of Cirrus into Cirrocumulus	Time lapse or sequence of images required to show transformation
Cirrocumulus cirrostratomutatus	Transformation of Cirrostratus into Cirrocumulus	Time lapse or sequence of images required to show transformation
Cirrocumulus altocumulomutatus	Decrease in size of all of the elements of a patch, sheet or layer of Altocumulus	Time lapse or sequence of images required to show transformation
Altocumulus nimbostratomutatus	Transformation of Nimbostratus directly into Altocumulus	Rare as Nimbostratus usually transforms into Altostratus when weather is clearing (or breaks in the weather)
Altostratus altocumulogenitus	Widespread ice crystal virga from Altocumulus forms into Altostratus	Rare event
Nimbostratus altostratomutatus	Thickening Altostratus, usual formation mechanism	Only discernible in time lapse
Nimbostratus stratocumulomutatus	Thickening stratocumulus, rare	Only discernible in time lapse
Nimbostratus altocumulomutatus	Thickening altocumulus, rare	Only discernible in time lapse
Nimbostratus	Spreading out of rain producing Cumulus	Extremely rare event

cumulogenitus		
Stratocumulus altocumulomutatus	Altocumulus transforming into Stratocumulus. Ac in the form of elements where they grow to the width of more than 3 fingers at arm's length	Rare event
Stratocumulus nimbostratomutatus	Transformation of Nimbostratus into Stratocumulus	Only discernible in time lapse; not to be confused with Stratocumulus nimbostratogenitus
Cumulonimbus altocumulogenitus	High based Cumulonimbus developing from Altocumulus castellanus	Difficult to confirm origin of Cumulonimbus from single image; not to be confused with Cumulonimbus developing from Cumulus congestus
Cumulonimbus altocumulogenitus	Cumulonimbus developing from Stratocumulus castellanus	As above
Clouds formed from persistent contrails	Persistent contrails that over a period of time evolve into cirriform cloud.	Cloud evolved from multiple persistent contrails may merge to give considerable sky cover.
Upper atmospheric lightning (Transient Luminous Events)	Elves: rapidly expanding rings of predominantly red light centered along the lower edge of the ionosphere (80-90 km) above active thunderstorms. Last about a millisecond in which they can expand to a diameter of 300 km.	Elves are too brief to see with the human eye and also difficult to catch on standard 30 fps video cameras.