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Data Article

# Timelapse images datasets (2017–2022) from Livingston and Deception Islands, Antarctica, to study snow cover and weather conditions at the PERMATHERMAL monitoring network

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A R T I C L E  I N F O

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A B S T R A C T

In the Deception and Livingston Islands, South Shetland Islands, Antarctica, two sites belonging to the international Circumpolar Active Layer Monitoring (CALM) network were established in 2005 and 2009, respectively, as part of the PERMATHERMAL network. In 2017, part of the installed instrumentation was upgraded, incorporating new CC5MPX automatic photographic cameras from Campbell Scientific to acquire three daily photographs at 5Mpx in resolution, 2592 × 1984 pixels in size, and JPEG format. The photographs are taken during the central hours of the day (14, 15, and 16 h GMT) to ensure maximum brightness, even during the Antarctic winter. Powered by batteries and solar panels, two cameras were installed at each site with a panoramic view, devoid of vegetation except for small patches of moss. At each study point, the cameras are oriented in different directions, providing diverse angles of the study area, and allowing observation of various fields of view in the environment. The result is a dataset of images acquired in the 2017–2022 period, organized by site, year, and month, capturing environmental conditions and spatial distribution of the snow cover. This dataset, besides documenting the snow cover, allows assessment of meteorological conditions, prevailing wind directions in the area during snow events, even

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in more distant areas from the study point due to the configured field of view. In the case of the images from Livingston Island, it also enables the study of the Limnopolar Lake's fluctuating water level during spring and summer. For the images from Deception Island, it provides insight into the presence of pack ice in Foster Port, relevant for volcanic activity and the safety of numerous vessels entering the caldera of the active volcano.



## Specifications Table

| | |
|---|---|
| Subject | Earth and Planetary Sciences - Atmospheric Science |
| Specific subject area | Meteorology and weather conditions, including snow cover accumulation and its spatial distribution. |
| Data format | Raw (jpeg) |
| Type of data | Image |
| Data collection | Automatic time-lapse images were captured using a CC5MPx camera from Campbell Scientific, installed on a metallic mast at about 1.5 m above the ground. Powered with a 12v 26 Ah battery and a 10 W solar cell, the cameras were set to take three pictures per day at 14:00, 15:00, and 16:00 GMT, with a maximum resolution of 5 megapixels, sized at 2592×1984 pixels. 2 cameras were installed in January 2017 (CL-CAM2 and LL-CAM2), and other two in January 2018 (CL-CAM1B and LL-CAM1B). In January 2022, CL-CAM2 was removed, and the three others are still operative nowadays.<br>No images have been excluded and gaps are due to power failures; therefore, the dataset remains complete as acquired and downloaded from the cameras. No image corrections or adjustments were made to the dataset. |
| Data source location | Automatic time-lapse camera's location:<br>• Deception Island, Crater Lake, CAM 1B: 62.9850S, 60.6814 W, 97 m<br>• Deception Island, Crater Lake, CAM 2: 62.9871S, 60.6768 W, 96 m<br>• Livingston Island, Byers Peninsula, CAM 1B: 62.6472S, 61.1081 W, 74 m<br>• Livingston Island, Byers Peninsula, CAM 2: 62.6486S, 61.1014 W, 77m |
| Data accessibility | Repository name: ZENODODue to the volume of data, the entire data collection have been split in datasets, all of them available at the PERMATHERMAL community in ZENODO repository organized by site, camera, and year, under this direct link: https://zenodo.org/communities/permathermal Access to individual datasets is available by next identification numbers and URLs:Deception Island, Crater Lake CAM 1B 2018:<br>• Data identification number: 10.5281/zenodo.4638087<br>• Direct URL to data: https://zenodo.org/records/4,638,088<br>Deception Island, Crater Lake CAM 1B 2019:<br>• Data identification number: 10.5281/zenodo.4637911<br>• Direct URL to data: https://zenodo.org/records/4,637,912<br>Deception Island, Crater Lake CAM 1B 2020:<br>• Data identification number: 10.5281/zenodo.4637604<br>• Direct URL to data: https://zenodo.org/records/4,637,605<br>Deception Island, Crater Lake CAM 1B 2021:<br>• Data identification number: 10.5281/zenodo.7802942<br>• Direct URL to data: https://zenodo.org/records/7,802,943 |

(continued on next page)

Deception Island, Deception Island, Crater Lake CAM 1B 2022:

- Data identification number: 10.5281/zenodo.7803035
- Direct URL to data: https://zenodo.org/records/7,803,036

Deception Island, Crater Lake CAM 2 2017:

- Data identification number: 10.5281/zenodo.4638141
- Direct URL to data: https://zenodo.org/records/4,638,142

Deception Island, Crater Lake CAM 2 2018:

- Data identification number: 10.5281/zenodo.4638173
- Direct URL to data: https://zenodo.org/records/4,638,174

Deception Island, Crater Lake CAM 2 2019:

- Data identification number: 10.5281/zenodo.4637829
- Direct URL to data: https://zenodo.org/records/4,637,830

Deception Island, Crater Lake CAM 2 2020:

- Data identification number: 10.5281/zenodo.4637770
- Direct URL to data: https://zenodo.org/records/4,637,771

Deception Island, Crater Lake CAM 2 2021:

- Data identification number: 10.5281/zenodo.7802997
- Direct URL to data: https://zenodo.org/records/7,802,998

Livingston Island, Limnopolar Lake CAM 1B 2018:

- Data identification number: 10.5281/zenodo.4638217
- Direct URL to data: https://zenodo.org/records/4,638,218

Livingston Island, Limnopolar Lake CAM 1B 2019:

- Data identification number: 10.5281/zenodo.4638226
- Direct URL to data: https://zenodo.org/records/4,638,227

Livingston Island, Limnopolar Lake CAM 1B 2020–21:

- Data identification number: 10.5281/zenodo.7803234
- Direct URL to data: https://zenodo.org/records/7,803,235

Livingston Island, Limnopolar Lake CAM 1B 2022:

- Data identification number: 10.5281/zenodo.7803269
- Direct URL to data: https://zenodo.org/records/7,803,270

Livingston Island, Limnopolar Lake CAM 2 2017:

- Data identification number: 10.5281/zenodo.4638193
- Direct URL to data: https://zenodo.org/records/4,638,194

Livingston Island, Limnopolar Lake CAM 2 2018:

- Data identification number: 10.5281/zenodo.4638208
- Direct URL to data: https://zenodo.org/records/4,638,209

Livingston Island, Limnopolar Lake CAM 2 2019:

- Data identification number: 10.5281/zenodo.4638233
- Direct URL to data: https://zenodo.org/records/4,638,234

Livingston Island, Limnopolar Lake CAM 2 2020–21:

- Data identification number: 10.5281/zenodo.7803251
- Direct URL to data: https://zenodo.org/records/7,803,252

(*continued on next page*)

Livingston Island, Limnopolar Lake CAM 2 2022:

- Data identification number: 10.5281/zenodo.7803289
- Direct URL to data: https://zenodo.org/records/7,803,289

Instructions for accessing these data: The data is available for free access and can be downloaded without any restrictions.Additionally, the same data could be accessible through two other repositories:

(1) The Spanish National Centre of Polar Data: http://cndp.utm.csic.es/portal/
  - Cameras at Deception Island: http://cndp.utm.csic.es/geonetwork/srv/eng/catalog.search#/metadata/CNDP_GDC_20,000,101_PERMATHERMAL_CAM
  - Cameras at Livingston Island: http://cndp.utm.csic.es/geonetwork/srv/eng/catalog.search#/metadata/CNDP_JCI_20,000,101_PERMATHERMAL_CAM

(2) The Phenocam project: https://phenocam.nau.edu/webcam/
  - DEC–CL-CAM1B: https://phenocam.nau.edu/webcam/browse/craterlake1b/
  - DEC–CL-CAM2: https://phenocam.nau.edu/webcam/browse/craterlake2/
  - LIV-LL-CAM1B: https://phenocam.nau.edu/webcam/browse/limnopolarlake1b/
  - LIV-LL-CAM2: https://phenocam.nau.edu/webcam/browse/limnopolarlake2/

## 1. Value of the Data

- These datasets consist of a collection of images acquired by multiple automatic timelapse cameras. The resulting data are visual evidence and a useful tool in understanding the harsh and variable weather conditions along the year at the study sites in Livingston and Deception islands, South Shetland Archipelago, in Antarctica.
- The images datasets could be also easily used to know the evolution of the snow precipitation events, the snow onset and offset dates, as well as the snow cover spatial distribution in the field of view, and the type of snow coverage (absence, patchy, discontinuous, continuous, etc.).
- The analysis of the weather and snow cover temporal and spatial patterns observed in the images could be used to interpret the data and behavior of parameters measured in automatic weather stations, or even in the analysis of the frozen ground thermal behavior, the development of vegetation, or the presence/development/evolution/growing of vegetation and fauna in the region.
- These datasets could be analyzed using Artificial Intelligent and/or automatic/supervised classification by a Geographic Information System, to map the snow cover in a selected area, providing daily maps of the presence/distribution. Using the marked poles existing in the observed areas, snow thickness could be also derived using these data.
- Additionally, changes on wind directions could be also derived from the images based on the surficial morphology of the snow when it covers the ground surface.

## 2. Background

In periglacial regions where freezing-thawing processes occur in ice-free areas, the thermal regime of soils is significantly influenced by the seasonal snow cover [1]. This presence affects the occurrence of both seasonally and permanently frozen ground, leading to interannual variability [2–4], primarily due to the insulative properties of snow. The insulating effect becomes significant when snow reaches a critical thickness, which varies based on its inherent properties [5]. In such contexts, understanding the evolution of snow cover becomes imperative at stations monitoring the thermal regime of permafrost or active layer thickness across the globe [6–11]. While snow depth probes [12] offer precise point values for snow depth evolution, comprehending its spatial variability requires diverse methodologies. Hence, the deployment of automatic cameras [13] has been adopted to capture daily images. These images enable subsequent mapping of 1) the spatial distribution of the snow mantle and 2) the type of snow cover present [14]. This data, especially in scenarios lacking or having limited thickness data, substantially aids in interpreting recorded soil temperature data and tracking the temporal evolution of surface and ground temperatures, thereby providing insights into the presence or absence of permanently frozen ground.

## 3. Data Description

In the PERMATHERMAL network space within the ZENODO data repository, datasets from the 2017 to 2022 period are available (Fig. 1), with each dataset corresponding to the individual time-lapse camera installed at each of the two study sites.

For each dataset (Fig. 2), a series of metadata is provided, including the dates of the first and last images contained, information on data gaps, the number of folders, and total images acquired during the period. Finally, a data preview and the download link are made available. Each dataset consists of a compressed ZIP file named according to the following format: AAA-BB-CAMCC-XXXX_v100.zip, where AAA corresponds to the region, DEC for Deception Island, and LIV for Livingston Island; BB corresponds to the study site, CL for Crater Lake, and LL for Limnopolar Lake; CC corresponds to the camera, either 1B or 2; and XXXX denotes the year or years of data collected in the dataset.

Once the zip file is decompressed, various folders are created, named with the following structure XXXX_YY, where XXXX represents the year, and YY represents the month (Fig. 3). Inside each folder, the images captured throughout that year and month are located (Fig. 3). The images, in JPG format, follow a naming structure: AAA_BB_CAMCC_XXXX_YY_ZZ_HH_MM_SS.JPG, where AAA stands for the region, BB for the site, CC for the camera number, XXXX for the year, YY for the month, ZZ for the day, HH for the hour, MM for the minutes, and SS for the seconds of the image capture (Fig. 2). It can be observed that, generally, three images are taken each day at 14, 15, and 16 h GMT, and each file size ranges between 1.5 and 2.5 Mb, resulting in datasets of approximately 1.5 to 1.8 Gb per year

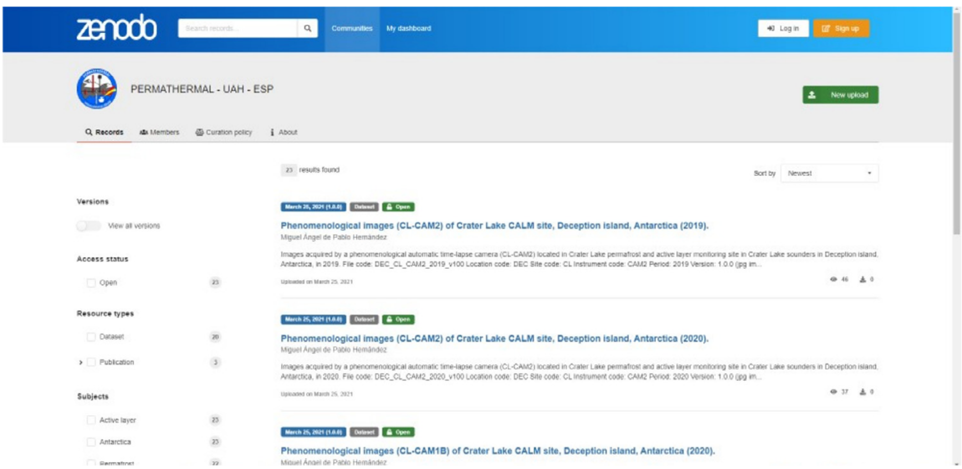


**Fig. 1.** Screenshot of the PERMATHERMAL community at the ZENODO repository showing the open datasets of timelapse images from cameras installed in Livingston and Deception Islands, Antárctica.

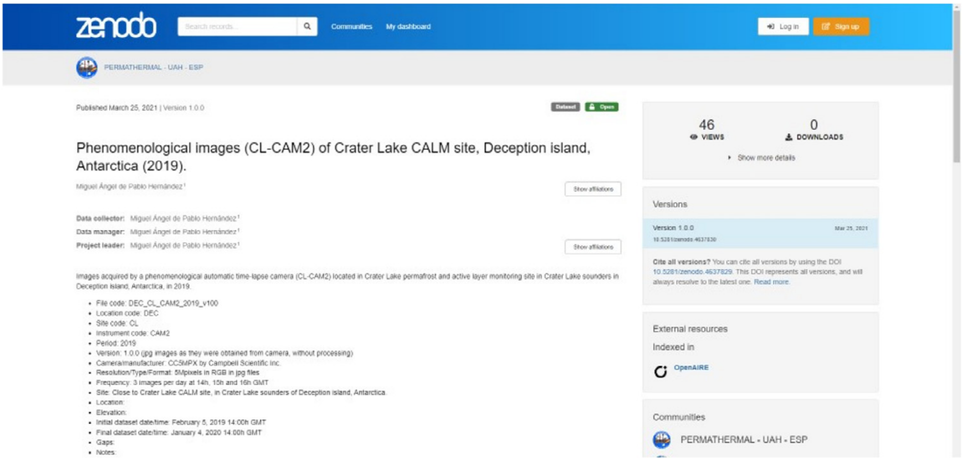


**Fig. 2.** Screenshot of an example of the information page of each dataset showing the metadata and the link to freely download the data without any requirement.

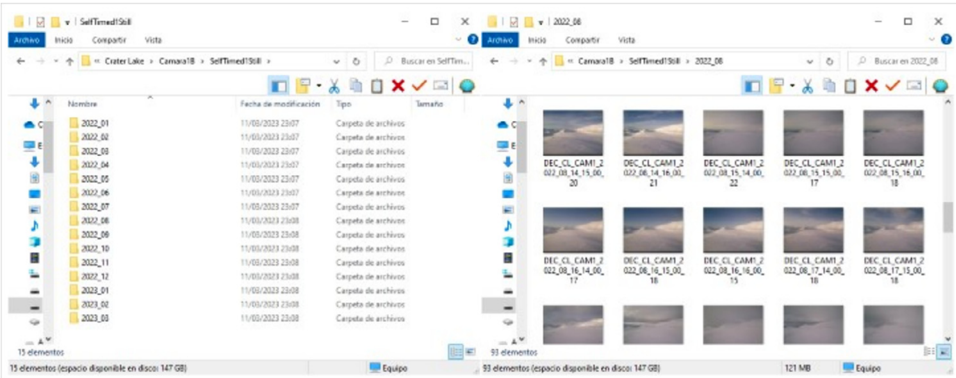

**Fig. 3.** (Left) Screenshot of the folders' structure contained in one of the datasets of images, organized by year and month. (Right) Screenshot of the content of one of the folders.

(Table 1). However, due to power or electronic failures, some years may have fewer captured images, or heavier files might be generated when the images were not downloaded annually (Table 1).

The images (Fig. 4), measuring 2592 × 1944 pixels, contain at their bottom a black band with reference information displayed in white text. On the left side, it includes the date and time of image capture, along with the site name. On the right side, it shows the camera temperature and the photograph number in the camera's sequence.

## 4. Experimental Design, Materials and Methods

### 4.1. Experimental design

The installation of time-lapse cameras as part of the instruments of the PERMATHERMAL network aims to capture daily photographs of the Circumpolar Active Layer Monitoring (CALM) grids [15,16]. These grids typically consist of square plots of 100 × 100 m marked on the ground

**Table 1**
Volume of data, in Gb, of the datasets, per camera and for the complete collection.

<table>
<tr><td>SITE</td><td colspan="2">DEC</td><td colspan="2">LIV</td></tr>
<tr><td>CAMERA CODE</td><td>CL-CAM1B</td><td>CL-CAM2</td><td>LL-CAM1B</td><td>LL-CAM2</td></tr>
<tr><td>2017</td><td>–</td><td>1.75</td><td>–</td><td>0.37</td></tr>
<tr><td>2018</td><td>1.53</td><td>1.71</td><td>1.51</td><td>1.87</td></tr>
<tr><td>2019</td><td>1.33</td><td>1.13</td><td>1.36</td><td>1.69</td></tr>
<tr><td>2020</td><td>1.77</td><td>0.85</td><td rowspan="2">3.01</td><td rowspan="2">3.75</td></tr>
<tr><td>2021</td><td>1.29</td><td>0.13</td></tr>
<tr><td>2022</td><td>1.69</td><td>–</td><td>1.54</td><td>1.99</td></tr>
<tr><td>Total</td><td>8.22</td><td>5.57</td><td>7.42</td><td>9.69</td></tr>
<tr><td>Global</td><td>30.89</td><td></td><td></td><td></td></tr>
</table>

with stakes placed every 10 m. Each summer, the thaw depth at each of the 121 nodes within these grids is measured by mechanical probing [16]. The main interest in these CALM sites is to obtain an average value representing the thaw depth for that year, enabling multi-year tracking [6,16]. These data complement continuous temperature measurements taken at various depths within boreholes throughout the year, which, among other things, help determine the thickness of the thawed soil [14].

However, understanding the spatial variability of the active layer thickness is also of interest, yet installing multiple temperature sensors can be costly. For this purpose, although with less precision, the incorporation of automatic cameras was designed to take pictures of the study grid area, as well as the surrounding environment and sky, to determine meteorological conditions during data collection, the presence and type of snow cover, and its extent beyond the control grid [14]. To achieve this goal, the need arose to place a camera at each of the study locations. This practice has been in place since 2005 [13], using low-resolution cameras (CC640 model from Campbell Scientific), which were later replaced with higher-resolution models (CC5Mpx, also from Campbell Scientific) [14]. These cameras, which constitute the datasets presented here, needed to be positioned higher than the CALM site to capture the entire surface with certain perspective.

Our experience with the old cameras revealed that during snowstorms, ice could adhere to the cameras, obstructing the view of the terrain. To mitigate this, it was decided to install an additional camera in an orthogonal or diametrically opposite location concerning the first camera, considering existing topographic circumstances. This arrangement would ensure that the cameras were not installed facing the same direction respect the wind, thereby preventing both from being affected by the same snowstorm. Consequently, the absence of valid images from one camera could be compensated for by those captured by the other. Furthermore, related to

**Fig. 4.** Examples of images acquired by the timelapse cameras.

the presence of ice obstructing the camera view, it was decided to capture three photos per day instead of one, anticipating that if one camera lens was obstructed, the others might not be affected. The new camera models allowed this due to their increased data storage capacity and lower energy consumption.

Additionally, to allow to estimate thickness variations across different points of the CALM grid using the images [17], markers were installed every 10 cm in the four corners and center of the grid. These markers served not only to approximate the thickness but also as reference points for camera focusing and georeferencing the images in possible post-processing and Geographic Information System (GIS) analysis. The potential thicknesses derived from image analysis could be compared with those obtained from snow depth probes [12], several of which were also newly installed along one diagonal of the grid [14].

## 4.2. Study sites

The study sites consist of two CALM grids belonging to the University of Alcalá's frozen soil monitoring network (PERMATHERMAL) deployed in the South Shetland Islands [13,14]. Specifically, these are the CALM sites Crater Lake (A16) and Limnopolar Lake (A25) located in Deception and Livingston Islands, respectively (Fig. 5). Both grids are square-shaped measuring 100 × 100 m and are situated in areas with homogeneous morphology and low slope.

The Crater Lake CALM site, positioned at about 1 km from the Spanish Antarctic Base "Gabriel de Castilla," is situated on a plateau at approximately 85 m altitude, to the south of an extinct volcanic crater named Crater Lake, from which it derives its name (Fig. 6). This plateau is characterized by a gentle slope towards the south, at the foot of the north-facing slopes within the collapsed caldera of Deception Island's active volcano. The area is geologically defined by the presence of pyroclastic materials with a very homogeneous surface grain size due to subsequent washing and deflation processes resulting from historical eruptions [18]. Although several lava flows are nearby, there are no signs of geothermal activity in the area. The zone is devoid of vegetation, although some mosses begin to sprout during the summer in certain spots, without forming patches of vegetation. The ground beneath the surface remains permanently frozen at a depth of around 50 cm [3,13].

The Limnopolar Lake CALM site is situated inland on the Byers Peninsula, approximately 1 km from the southern coast of the peninsula and a few meters from the southwestern margin of Lake Limnopolar, from which it derives its name (Fig. 6). This site is located within one of the numerous gentle depressions characterizing the deglaciated area of the Byers Peninsula, excavated by glaciers, often forming lakes, including Limnopolar [19]. The site's location is marked by a gentle slope in the northeast direction and a homogeneous terrain with volcaniclastic materials ranging from clayey to decimeter-sized blocks formed by frost weathering. It's possible that permanently frozen soil exists at depths exceeding 160 cm below the surface [2,13]. Although there is altitudinal variability, both islands are climatically characterized as cold maritime at sea level, with mean annual air temperatures (MAAT) ranging from −2 to −1 °C but could reach −4 °C at high elevation [20,14]. Annual precipitation, mostly in the form of snow, amounts to approximately 500 mm at sea level, with increased accumulation during spring. Although liquid precipitation is common at lower elevations in summer [20]. Winds vary in direction, predominantly from the southwest at an average annual speed of roughly 25 km/h, occasionally reaching peaks of 140 km/h near the study sites [20]. These harsh weather conditions are what we wanted to capture in images, and observe the snow cover onset, offset and distribution at the CALM sites.

## 4.3. Installing and setting the cameras

In January 2017, a camera was installed at each CALM site, and complemented with a second camera in January 2018. Each of these cameras (Fig. 7) was affixed to a steel metallic mast

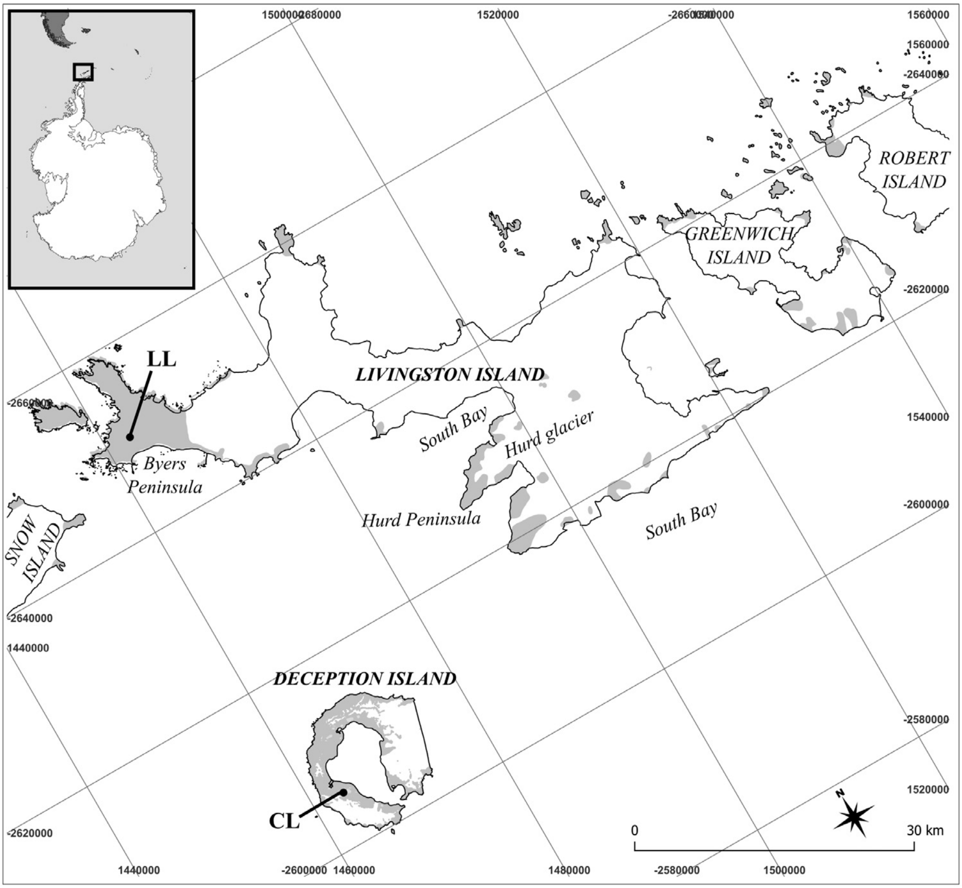


**Fig. 5.** Location map of the Antarctic sites where CALM stations named Crater Lake (CL) at Deception Island, and Limnopolar Lake (LL) at Byers Peninsula of Livingston Island, were established in 2005 and 2019, respectively, and where 2 automatic time-lapse cameras were installed at each station in early 2017 and 2018.

using the manufacturer-provided anchors, allowing camera positioning and orientation adjustments along the X and Y axes to refine the field of view. Each camera was powered via a cable (provided by the manufacturer) connected to a charge regulator, specifically the CH100 model, situated within a weatherproof IP66-rated ENC14/16 box from Campbell Scientific. An Enersys 12V 26Ah Genesys battery was placed within the same weatherproof box and linked to the charge regulator. Additionally, a 10 W solar panel was affixed to the mast using metal elements adjacent to the camera. To secure the mast to the ground and minimize vibrations due to strong winds in the area [20], steel cables were fastened to 3 or 4 metal stakes measuring up to 70 cm in length. The cameras were positioned to encompass the entire study grid, capturing the immediate surroundings and part of the sky to monitor surface variability and meteorological conditions.

The configuration of the CC5Mpx cameras was performed via a web interface using a 10/100 Ethernet cable connected to one of the camera's terminals. Configuration was conducted using a Windows-based laptop, accessing the local IP address of the device. Through the web tool, settings were adjusted (disabling motion-triggered shots and external triggers) to capture 3 images at intervals of 60 min between 14:00 and 16:00 GMT, corresponding to the local solar noon (11:00, 12:00, and 13:00 local time), with a maximum resolution of 2592×1944 pixels in JPEG

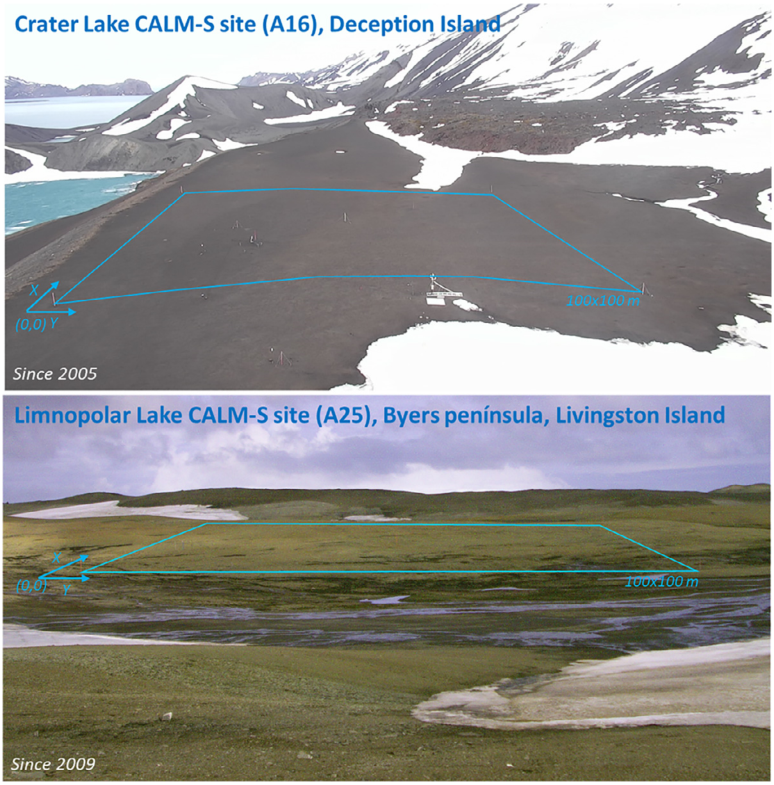


**Fig. 6.** Pictures of the 100 × 100 m grids of Crater Lake CALM site (top) and Limnopolar Lake CALM site (bottom), in Deception and Livingston islands, respectively.

format. The cameras were set to display information including the site's name, date and time of data capture, and camera temperature in a lower band on each image. These images were stored on a 4GB internal SD card. To determine the field of view, the lens protector was opened to access the zoom and focus functions, adjusting them to cover the entire CALM grid and focusing using the previously installed marking steaks. This is possible on real time through the web setting page of the device thanks to the real time video connection of the camera, that allow to focus it directly in the field with a laptop. After repositioning of the lens protector. And finishing the configuration, the Ethernet cable was disconnected, and the camera's access terminals were closed.

### 4.4. Camera maintenance

The cameras were typically maintained annually during the Antarctic campaigns organized by the Spanish Polar Research Program under the Ministry of Science and Innovation of the Government of Spain. During these campaigns, one or more visits were conducted to each camera. Initially, data was downloaded using a portable device connected via an Ethernet cable, accessing the camera's internal SD memory through FTP connection management software, such as Filezilla, on a laptop. Accessing the device's local IP enabled the bulk download of images and subsequent memory wipe. During the visit, the camera underwent inspection: sealing of terminals, checking the internal memory status, focus adjustment, among other aspects. Additionally,

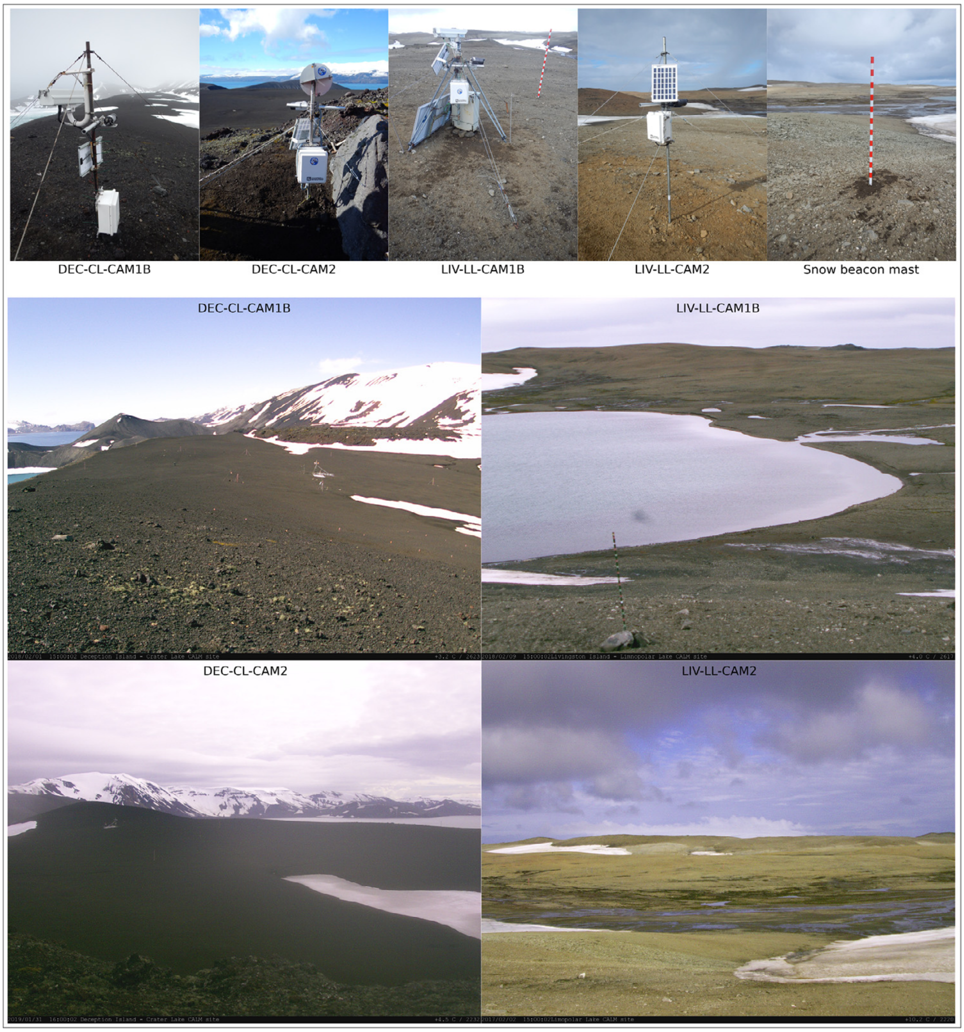


**Fig. 7.** Pictures of the 4 time lapse cameras (top) installed at the Crater Lake CALM site (CL) and Limnopolar Lake CALM site (LL) in Deception (DEC) and Livingston (LIV) Islands, respectively, as well as an example of the 2 m long marked snow beacon masts installed at the CALM grids corners and center to easy visually delimit the grid in the images, as well as to derive snow thickness. Fields of view of each camera is show in images acquired from each device (bottom).

the condition of the mast, weatherproof box, solar panel, and battery were evaluated. Quick preview of some images helped identify any possible changes in the camera's position caused by wind, which might not be evident due to mast displacement or damaged guy wires. If any changes were observed, efforts were made to reposition the camera adequately and readjust or repair the wires if damaged. When necessary, battery replacement was carried out if deeply discharged during winter. Occasionally, a second visit was required to verify the effectiveness of the maintenance procedures and to seal and secure the camera.

The high memory capacity (4 Gb), combined with capturing only 3 photos per day, provided enough memory to store images for over two years. This becomes crucial when, due to logistical constraints, visiting one of the cameras is not feasible, allowing the camera to continue capturing and storing data. This was the case in January 2021 at CALM LL site, which couldn't be visited

**Fig. 8.** Example of images acquired by the time lapse cameras showing loss of visibility of the field of view due to the presence of ice in the protection glass (top), and images showing changes on the field of view due to movement of the supporting mast caused by the strong winds (bottom).

due to logistical complications arising from the COVID-19 pandemic. Upon revisiting in January 2022, all images captured in 2020 and 2021 were successfully downloaded, keeping complete the time series of data.

## Limitations

This dataset has several limitations:

- Gaps in the data sequence are present due to:
    1. Cameras being installed in pairs over two consecutive years, causing the time series to begin at different points for each camera.
    2. Initial configuration errors leading some cameras to initially capture only 1 photo per day instead of the intended 3.
    3. Power loss caused by solar panel positioning and low illumination during the Antarctic winter, resulting in the discontinuous operation of some cameras.
    4. Electronic failures due to leakage problems and the presence of salt causing malfunctions.
- Loss of visibility or image quality occurs during certain snowstorms when ice adheres to the glass protecting the lens, obstructing the view of the terrain for one day to complete months. Although an image is captured, the terrain cannot be fully or partially perceived (Fig. 8).

- Shift in the field of view occurred due to strong winds in Antarctica moving the structure holding the camera, resulting in slight changes in the field of vision at certain points in the time series (Fig. 8).

## Ethics Statement

The author has read and follow the ethical requirements for publication in Data in Brief and confirming that the current work does not involve human subjects, animal experiments, or any data collected from social media platforms.

## Declaration of generative AI and AI-assisted Technologies in the Writing Process

During the preparation of this work the author used ChatGPT in order to improve language and text readability. After using this tool/service, the author reviewed and edited the content as needed and take full responsibility for the content of the publication.

## Data Availability

Timelapse images from Antarctica. List and links to the datasets (Original data) (ZENODO)

## CRediT Author Statement

**Miguel Ángel de Pablo:** Conceptualization, Methodology, Resources, Data curation, Writing – original draft, Writing – review & editing, Project administration, Funding acquisition.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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