Assessment Information

[CoreTrustSeal Requirements 2017–2019](#)

Repository:	World Glacier Monitoring Service, Zurich
Website:	http://www.wgms.ch/
Certification Date:	19 August 2019

This repository is owned by: **University of Zurich**

Core Trustworthy Data Repository Requirements

BACKGROUND INFORMATION

Context

R0. Please provide context for your repository.

Repository Type.

Domain or subject-based repository

Reviewer 1:

Accept

Reviewer 2:

Accept

Comments

Since 1894, the World Glacier Monitoring Service (WGMS) and its predecessor organizations have been compiling and disseminating standardized data on glacier fluctuations: www.wgms.ch

Reviewer 1:

Accept

Reviewer 2:

Accept

Brief Description of the Repository's Designated Community.

The WGMS designated community consists of three different communities: a) the data providers, b) data users and c) information users.

a) The WGMS has collected and published standardized information about ongoing glacier fluctuations and events, i.e., changes in glacier length, area, volume, and mass. In response to calls-for-data, observations are contributed through an international scientific collaboration network, which consists of WGMS National Correspondents and Principal Investigators in over 30 countries worldwide (http://wgms.ch/contact_ncs/). Submitted data are converted into standardized formats and uploaded into the Fluctuations of Glaciers database. Each version of the database is given a digital object identifier and made available to the public.

b) the submitted data is freely available and mainly used by the scientific communities. More specifically, these include researchers from different disciplines, as such glaciologists interested in process understanding and analysis of individual glaciers, hydrologists investigating regional runoff, or environmental modellers assessing global sea level budgets. The WGMS datasets are widely used in the context of climate change studies. E. g. they have been cited in all five Assessment Reports of Working Group I of the Intergovernmental Panel on Climate Change (IPCC). In addition, the data are also often used for educational purposes at university levels and international summer schools (e.g.: https://wgms.ch/mb-training-course-2016/).

c) derived information, such as annual ice loss, are regularly compiled for and requested from:

- various state-of-the-climate reports (e.g., BAMS, WMO, Copernicus Climate Change),

- national and international agencies (e.g., national environmental agencies, UNEP, EEA)

- media

- the wider public

Reviewer 1:

Accept

Reviewer 2:

Accept

Level of Curation Performed.

C. Enhanced curation – e.g. conversion to new formats; enhancement of documentation

Reviewer 1:

Accept

Reviewer 2:

Accept

Comments

The core database of WGMS is the Fluctuations of Glaciers (FoG) database (http://wgms.ch/data_databaseversions/) including standardized data on glacier changes in length, area, volume and mass.

Data access to individual glacier series is provided through the FoG browser (table -> download): https://www.wgms.ch/fogbrowser/

Download of the full database is possible for the current and previous versions:

https://wgms.ch/data_databaseversions/

In addition, we maintain and disseminate datasets on:

- glacier thickness observations (GlaThiDa: https://www.gtn-g.ch/data_catalogue_glathida/)

- glacier regions (GlacReg: https://www.gtn-g.ch/data_catalogue_glacreg/)

- historic glacier data publication repository (http://wgms.ch/literature_published_by_wgms/)

- historic glacier map repository (http://wgms.ch/products_fog_maps/)

- physical glacier library (http://wgms.ch/literature_wgms_library/)

- collection of glacier monitoring guidelines (http://wgms.ch/data_guidelines/)

Reviewer 1:

Accept

Reviewer 2:

Accept

Outsource Partners. If applicable, please list them.

In close collaboration with the U.S. National Snow and Ice Data Center (NSIDC) and the Global Land Ice Measurements from Space (GLIMS) initiative, the WGMS runs the Global Terrestrial Network for Glaciers (GTN-G) in support of the United Nations Framework Convention on Climate Change (UNFCCC): www.gtn-g.org

See also the GTN-G organigram: https://www.gtn-g.org/pics/GTN-G_Organigramm_v2.pdf

Within GTN-G executive board we coordinate glacier-monitoring activities with our partners, such as the joined data-browser (https://www.gtn-g.ch/data_browser/) or glacier monitoring sessions at EGU and AGU (https://meetingorganizer.copernicus.org/EGU2019/session/31064).

Through the GTN-G advisory board chaired by IACS, we get strategic steering from our scientific community and are periodically evaluated.

Reviewer 1:

Accept

Reviewer 2:

Accept

Other Relevant Information.

Some basic statistic on our service

1. WGMS network:

National Correspondents from more than 40 countries (https://wgms.ch/contact_ncs/) and several hundred active Principle Investigators from all over the world. On an annual basis they provide 7000 data records from more than 600 glaciers.

2. WGMS database:

Database statistics are available here: https://wgms.ch/data_databasestats/

3. Users:

The WGMS registers 2.000-3.000 website visits per month, 10.000 users of the WGMS glacierApp (total), and about a dozen data and information requests a week through our mailbox.

Reviewer 1:

Accept

Reviewer 2:

Accept

ORGANIZATIONAL INFRASTRUCTURE

I. Mission/Scope

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R1. The repository has an explicit mission to provide access to and preserve data in its domain.

WGMS is a service of the International Association of the Cryospheric Sciences of the International Union of Geodesy and Geophysics (IACS, IUGG) as well as of the World Data System of the International Council for Science (WDS, ICSU) and works under the auspices of the United Nations Environment Programme (UNEP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the World Meteorological Organization (WMO).

The WGMS maintains a network of local investigators and national correspondents in all countries involved in glacier monitoring. As a contribution to the Global Terrestrial/Climate Observing System (GTOS, GCOS), the Division of Early Warning and Assessment and the Global Environment Outlook of UNEP, and the International Hydrological Programme of UNESCO, the wgms collects and publishes worldwide standardized glacier data.

In close collaboration with the U.S. National Snow and Ice Data Center (NSIDC) and the Global Land Ice Measurements from Space (GLIMS) initiative, the WGMS is in charge of the Global Terrestrial Network for Glaciers (GTN-G) within GTOS/GCOS. GTN-G aims at combining (a) in-situ observations with remotely sensed data, (b) process understanding with global coverage and (c) traditional measurements with new technologies by using an integrated and multi-level strategy.

The tasks of GTN-G are:

- to collect and publish standardized data on glacier fluctuations at 5-yearly intervals,

- to prepare a bulletin reporting mass balance results of selected reference glaciers and ice caps at 2-yearly intervals,

- to manage and upgrade the existing inventory of glaciers and ice caps,

- to stimulate satellite observations of remote glaciers and ice caps in order to reach global coverage, and

- to periodically assess ongoing changes.

Links to mission statements can be found here:

NSIDC/WGMS memorandum of understanding (from 2008, not public)

IACS/IUGG on WGMS: https://cryosphericsciences.org/organization/wgms/

IACS/IUGG on GTN-G: https://cryosphericsciences.org/organization/standing-groups/

IACS/IUGG on GTN-G terms of references: https://www.gtn-g.ch/network_steeringcommittee/

ICUS-WDS: http://www.icsu-wds.org/community/membership/regular-members/@@member_view?fid=world-glacier-monitoring-service-zurich

The core funding of the WGMS is guaranteed through a long-term contract between the University of Zurich and the Federal Meteorological Service (MeteoSwiss) including a statement of mission: https://wgms.ch/about_funding/

Reviewer 1:

Accept

Reviewer 2:

Accept

II. Licenses

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R2. The repository maintains all applicable licenses covering data access and use and monitors compliance.

Within GTN-G we provide our data under the fundamental principal of full and open exchange of data and information for scientific and educational purposes: http://www.gtn-g.ch/data_policy/

This data policy is communicated to users automatically with each data download as well as by communication through email:

"When using these data, please cite as WGMS (2017, and earlier reports) and/or the original investigators and sponsoring agencies according to the available meta-information: WGMS 2017. Global Glacier Change Bulletin No. 2 (2014-2015). Zemp, M., Nussbaumer, S. U., Gärtner-Roer, I., Huber, J., Machguth, H., Paul, F., and Hoelzle, M. (eds.), ICSU(WDS)/IUGG(IACS)/UNEP/UNESCO/WMO, World Glacier Monitoring Service, Zurich, Switzerland, 244 pp., publication based on database version: doi:10.5904/wgms-fog-2017-10.

The data might be subject to errors and inaccuracies. Hence, we strongly suggest to perform data quality checks and, in case of ambiguities, to contact us as well as the investigators and sponsoring agencies of the glaciers!"

Reviewer 1:

Accept

Reviewer 2:

Accept

III. Continuity of access

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R3. The repository has a continuity plan to ensure ongoing access to and preservation of its holdings.

Active annual call for data through our network of national correspondents (http://wgms.ch/data_submission/) guarantees our users direct and continuous access to updated glacier observations.

The 'Global Glacier Change Bulletin' (GGCB) series provides an integrative assessment of worldwide and regional glacier changes at two-year intervals, printed both as hardcopy and online publication. The hardcopy version including full data appendix is sent to 150 libraries worldwide to guaranty long-term data availability.

Direct online open access through various interfaces: e.g.

- full database download: http://wgms.ch/data_databaseversions/

- FoG webbrowser: http://www.wgms.ch/fogbrowser/

- WGMS GlacierApp: http://wgms.ch/glacierapp/

Within the framework of GTN-G we closely collaborate with the US National Snow and Ice Data Center (NSIDC), which could provide a systematic backup solution for the datasets hosted at WGMS.

A mutual mirror-side solution will be discussed at the next meeting of the GTN-G executive board (to be held during EGU in Vienna, April 2019). In this context, the existing MoU between NSIDC and WGMS will be reviewed and probably updated.

Reviewer 1:

Accept

Reviewer 2:

Accept

IV. Confidentiality/Ethics

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R4. The repository ensures, to the extent possible, that data are created, curated, accessed, and used in compliance with disciplinary and ethical norms.

Our fundamental basic norms follow the principles of full and open access, in our discipline e.g. a basic requirement for long-term and global climate studies. To our knowledge there is no special ethical norm for glacier data.

Reviewer 1:

Accept

Reviewer 2:

Accept

V. Organizational infrastructure

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

R5. The repository has adequate funding and sufficient numbers of qualified staff managed through a clear system of governance to effectively carry out the mission.

Thanks to governmental support and the hosting at the University of Zurich, the WGMS has a minimal core funding (2 FTE) to guarantee long-term operation of the coordinating office: http://wgms.ch/about_funding/

Actually the service consists of an operational team of the director and two half-time staff, and a strategic team without dedicated funding but with a strong interest in glacier monitoring activities. In addition, the WGMS hosts several trainees (usually students at master level) and guest scientists per year.

In addition, projects with space agencies and EUs Copernicus Climate Change Service allow actively foster glacier observations from space: http://wgms.ch/boost-remote-sensing-data/

While the contract guarantees long-term financial support, the current budget has to basic shortcomings:

1. increasing labour costs (job grading and social taxes) need to be covered from overall budget and hence reduce the available resources over the years.

2. growing datasets and the number of requested data dissemination interfaces urge for an extension of the current staff with an IT expert.

These two challenges will be addressed in the next evaluation of the WGMS through the sponsoring agencies in 2019 in view of the next four-year budget period (2020-2023).

With regard to our network: our Principle Investigators around the globe are permanently challenged by the lack of funding for maintaining their long-term glacier monitoring programs.

Reviewer 1:

Accept.

Core funding provides stability, which is essential. Challenges have been recognized and solutions are sought actively.

Reviewer 2:

Accept

VI. Expert guidance

R6. The repository adopts mechanism(s) to secure ongoing expert guidance and feedback (either in-house, or external, including scientific guidance, if relevant).

Within GTN-G, a Steering Committee was established to coordinate, support, and advise the WGMS, the NSIDC, and the GLIMS initiative regarding the monitoring of the 'Essential Climate Variable' (ECV) "glaciers and ice caps". It consists of:

- an Executive Board that is responsible for (i) developing and implementing the international observation strategy for glaciers and ice caps, (ii) providing standards for the monitoring of glacier fluctuations (e.g., length change, mass balance) and inventories, and (iii) compiling and distributing such information in a standardized form.

- an Advisory Board under the leadership of the International Association of Cryospheric Sciences (IACS) that will (i) support, (ii) consult, and (iii) periodically evaluate the work of the Executive Board and its three operational bodies regarding the monitoring of glaciers and ice caps.

For more details see the official document describing the generic structure and the Terms of Reference of the GTN-G Steering Committee.

Generic structure and terms of references: http://www.gtn-g.org/GTNG_genericstructure.pdf

DIGITAL OBJECT MANAGEMENT

VII. Data integrity and authenticity

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R7. The repository guarantees the integrity and authenticity of the data.

WGMS process to ensure data integrity and authenticity, as approved by the GTN-G advisory board:

1. Annual call-for-data based on standardized guidelines and digital data submission forms (including both observations and related metadata). The identity of the depositors are checked through our national correspondents as well as through regular direct contacts within the relatively small glaciological community.

2. Incoming data are checked for completeness and plausibility and stored in the original format.

3. The received data (from many files) is manually copied into one common upload form. Here, data corrections (e.g. units) and completions (e.g. calculations of glacier-wide balances based on elevation bands) are made in accordance with the data provider. These changes are documented and stored with the original incoming data.

4. Upload to WGMS FoG database, including several checks (e.g. primary key consistency, data redundancies).

5. We keep track of all data providers and sponsoring agencies for each glacier, year and observation type through the WGMS cooperation database (linked to FoG database).

6. Annual release of new database version including DOI (used for strict versioning control). This versioning allows also for identification of corrupt data entries and serves as backup.

7. Update of digital and print products based on new data release.

8. Every second year production of a printed report (Global Glacier Change Bulletin), proofread by all data providers.

The WGMS database is made available on our website (www.wgms.ch/databaseversions).

The use of DOIs guarantees stable landing pages and strict versioning of the database.

Potential improvements to be implemented in 2019 include the introduction of a log-file keeping track of all database changes between two official data releases.

Reviewer 1:

Accept

Reviewer 2:

Accept

VIII. Appraisal

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R8. The repository accepts data and metadata based on defined criteria to ensure relevance and understandability for data users.

The WGMS regularly compiles and publishes standardized data on glacier changes in length, area, volume, and mass based on in-situ and remotely sensed observations. A corresponding call-for-data is annually sent out through the National Correspondents of the WGMS who organize the collection and submission of the glacier data within their country. Apart from the official calls-for-data, the WGMS welcomes any glacier data that is submitted according to the standards described:

http://wgms.ch/downloads/WGMS_AttributeDescription.pdf

All incoming data are checked by the WGMS staff for plausibility (e.g. unit check and comparison to data submission from previous years) and consistency (e.g. verification check by making use of redundant information) as described in R7. In cases of ambiguities or missing information, the data provider is contacted and encouraged to revise the original data submission.

Reviewer 1:

Accept

Reviewer 2:

Accept

IX. Documented storage procedures

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R9. The repository applies documented processes and procedures in managing archival storage of the data.

The WGMS works with an internal document (WGMS manual) that describes the process chain from data-to-product. With this we guarantee the standardized procedure within the WGMS core team.

As an insight, we provide the table of content of the internal documents including the full text of the first bullet:

1. Call-for-data

An annual call-for-data is sent out from the WGMS mailbox to all WGMS National Correspondents (http://wgms.ch/contact_ncs/), the Principal Investigators (PIs) of glacier mass balance programs (for addresses see WGMS Cooperation Database) and is announced on CRYOLIST (http://cryolist.org/) between end of September and early October.

Corresponding guidelines and a digital form for data submission need to be updated and provided from the WGMS website: http://wgms.ch/data_submission/

Deadline for data submission is usually set to 1st of December with a reminder email in the week before. During December, individual reminders are sent with a focus on PIs of reference glaciers with more than 30 observation years.

Incoming data are checked for completeness and plausibility and stored in a group folder: Y:\wgms_office\Data\Data_in

Preliminary mass balance values together with information about PIs and their sponsoring agencies are published online: http://wgms.ch/latest-glacier-mass-balance-data/

By end of the year or in the first week(s) of January, the newly available data is announced on CRYOLIST.

2. Upload FoG-Database/ Coop-Database

3. Queries: Data Requests, MinData, MetaData

4. MinDataSeries.csv, MinDataGraphs.png

5. ArcGIS Online Feature Service

6. Update of WGMS Fluctuations of Glaciers Browser

7. Update GlacierApp

8. Update WMS, WFS and CSW used by external data portals

9. Update of Figures and Table for GGCB & FAQs

10. Update of WGMS & GTN-G Websites

11. Google Analytics

Reviewer 1:

Accept

Reviewer 2:

Accept

X. Preservation plan

Compliance Level: 3

Reviewer 1:

3

Reviewer 2:

3

R10. The repository assumes responsibility for long-term preservation and manages this function in a planned and documented way.

The long-term data preservation is managed within the long-term core funding from the Swiss government, which includes internal reporting and budgets (available on request) at annual and five-year intervals. http://wgms.ch/about_funding/

In addition, the long-term preservation plan is documented and reflected in periodical evaluations by our auspices organizations (IACS/IUGG, WDS/ISC).

Our preservation plan for continued access to current and earlier versions of the database is twofold:

1. access to current and earlier database versions through established and open data formats (csv. files) including DOIs (dating back to 2008)

2. access to data reports in hardcopy and digital formats (including data appendices) back to 1895 (https://wgms.ch/literature_published_by_wgms/) from our website and in libraries around the world.

The collaboration with the data providers from the research community is on a voluntary base usually without specific contracts. Through the active data submission, the providers are fully aware of the open access to their data, as stated in the call-for-data guidelines and on our website (https://wgms.ch/data_policy/). In return, they appreciate the public visibility of their name and affiliation, as cited in the database, as well as in online and printed products.

In view of upcoming challenges mainly related to increased data volumes and new formats from space-borne remote sensing, the WGMS and IT experts will organize a workshop in 2019 to evaluate the current status of its database infrastructure and management.

Reviewer 1:

Accept.

In the future, one would expect WGMS to publish a data preservation plan/policy.

Reviewer 2:

Accept

XI. Data quality

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R11. The repository has appropriate expertise to address technical data and metadata quality and ensures that sufficient information is available for end users to make quality-related evaluations.

After data submission, an expert plausibility check (manual and semi-manual) occurs before data upload in the database, as already described in R7 and R8.

Biannual printing of reports provides an important review of the data by the data providers and thus by the scientific community.

In addition, we provide detailed guidelines and examples for best practice on our website: http://wgms.ch/data_guidelines/

Reviewer 1:

Accept

Reviewer 2:

Accept

XII. Workflows

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R12. Archiving takes place according to defined workflows from ingest to dissemination.

As mentioned before, the WGMS works with an internal document (WGMS manual, see R9) that manages the work flow from the submitted data to the final product. Archiving occurs on several stages:

- directly with annual submission (original/raw data)

- integration in the database

- publication on and access through our website (preliminary data, FoG Browser, full database access)

- print publication (bi-annual)

The different outputs are checked by the WGMS staff as well as by the corresponding data providers.

Changes in the workflow are reflected and documented in this internal document.

Reviewer 1:

Accept

Reviewer 2:

Accept

XIII. Data discovery and identification

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R13. The repository enables users to discover the data and refer to them in a persistent way through proper citation.

All existing data is searchable and accessible via the FoG data browser:

http://wgms.ch/fogbrowser/

as well as via the GTN-G data browser: http://www.gtn-g.org/data_browser/

Since 2008 the WGMS database is identifiable with Digital Object Identifiers (DOIs):
http://wgms.ch/data_databaseversions/

DOI's are assigned to the complete database and used for versioning of the annual data releases.

Older version can be cited by referencing the published reports (back to 1894!):
http://wgms.ch/literature_published_by_wgms/

When users download data from the FoG Browser, they are informed about applying proper citation:

"When using the data, cite the World Glacier Monitoring Service (WGMS 2017, and earlier reports) and/or the original investigators and sponsoring agencies according to the available meta-information."

Examples for the citation of individual datasets (versus the full dataset) are given for the glacier map collection (https://wgms.ch/products_fog_maps/):

e.g., Arnold 1977: White Glacier. In: PSFG (1977): Fluctuations of Glaciers 1970-1975 (Vol. III). F. Müller (ed.), IAHS (ICSI) / UNESCO, Permanent Service on Fluctuations on Glaciers, Zurich, Switzerland: 269 pp., WGMS (2018): Glacier Map Collection (GMC), World Glacier Monitoring Service, Zurich, Switzerland. DOI: 10.5904/wgms-maps-2018-02

Such examples for individual data citation will be added for the other datasets, too.

Since 2018 and thanks to the support of Global Cryosphere Watch (WMO), we provide access to Open Geospatial Consortium (OGC) services for machine readable metadata access to the WGMS FoG database (see https://wgms.ch/data_exploration/).

Reviewer 1:

Accept

Reviewer 2:

Accept

XIV. Data reuse

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R14. The repository enables reuse of the data over time, ensuring that appropriate metadata are available to support the understanding and use of the data.

Since 2018, WGMS provides metadata access to the FoG database through OGC services (https://wgms.ch/data_exploration/). The format of data submission forms and corresponding database fields are well-accepted in the glaciological community (as historically grown over more than a century), but do not exactly follow a wider standard (such as WMO or ISO).

The reuse of data is ensured through database versioning using DOIs (http://wgms.ch/data_databaseversions/)

The detailed description of all fields are made available publicly (https://wgms.ch/data_submission/) together with data tables in csv format in order to allow multiple database implementations (e.g., Oracle, MSAccess). A simplified version of the entity relationship model is published and described in Zemp, 2012 (http://www.geo.uzh.ch/~mzemp/Docs/Zemp_Habil_2011_PartA.pdf).

With additional resources, a detailed and updated description of all GTN-G databases including entity relationship models and corresponding field descriptions could be published in an academic journal, such as Earth System Science Data.

This is currently under discussion with our partner organization NSIDC for implementation in the next few years.

Reviewer 1:

Accept

Reviewer 2:

Accept

TECHNOLOGY

XV. Technical infrastructure

Compliance Level: 4

Reviewer 1:

4

Reviewer 2:

4

R15. The repository functions on well-supported operating systems and other core infrastructural software and is using hardware and software technologies appropriate to the services it provides to its Designated Community.

The IT support through the hosting institute is part of the contract between MeteoSwiss and University of Zurich. The day-to-day collaboration between the WGMS and the IT happens on mutual agreement, with periodical meeting, but without a formal service level agreement.

The interface for data providers allows open and simple data formats, such as csv and excel for data submission (http://wgms.ch/data_submission/).

The IT infrastructure (hardware, etc.) and most of the interfaces to access data are state-of-the-art; for details see R16. But, the current database solution (MS Access) is at is limits in regard of increasing data volumes and in view of the upcoming need for automated update of the various interfaces. This issue will be addressed in the next evaluation of the WGMS through the sponsoring agencies in 2019 in view of the next four-year budget period (2020-2023).

Reviewer 1:

Accept

The systems are sufficient for the repository for now. It is good that limitations have been recognized and will be addressed.

Reviewer 2:

Accept

XVI. Security

Compliance Level: 4

Reviewer 1:

Accept

Reviewer 2:

Accept

R16. The technical infrastructure of the repository provides for protection of the facility and its data, products, services, and users.

WGMS is integrated in the IT infrastructure of the Department of Geography, University of Zurich. Details on hardware, software and related backup strategies include:

- group space and home directories on central file server of the department

- the file server is designed for high reliability and file integrity:

  - file server is sporting ZFS filesystem, discovering bit rot due to regular pool scrubbing

  - two tiered storage layout with storage frontends and mirrored backends integrated via iSCSI

  - storage backends are mirrored ZFS pools themselves

  - file system snapshots are provided for fast recovery of accidently deleted files or access to older versions (snapshots every 4 hours during work hours, kept for 5 days. Daily snapshots kept for a month, monthly for a year)

- storage backends located in two different server rooms, on two different floors in two sections of the building (separated by a physical firewall) with dedicated fiber interconnect

- access to the server rooms is restricted to the IT staff of the department (and *a lot* of facility people ...)

- server rooms secured with Legic locks, access is logged

- offsite backup of all data is realized by means of the IBM Spectrum Protect (formerly Tivoli Storage Manger) offering of the UZH (see http://www.id.uzh.ch/de/dl/backup/alle.html)

- "active" copy of a file is kept on offsite backup forever. Up to 4 "inactive" (i.e. old) versions of a file are kept for 31 days. Deleted files are kept for 91 days.

- access to home and group spaces by (at least) SMB 2.0 protocol only. All access is authenticated. Within the department NFS access for a limited set of IT-managed servers is provided.

- SMB access from outside the UZH network requires a prior VPN connection

- authorization for data access is governed by group memberships. Only the owner of a group space can request changes in group memberships. All requests are logged in a ticketing system.

- home directories are user exclusive only

- password policies recommend a password length of 12 or more characters (at least 8 enforced). At least one numeric or special character is required.

Reviewer 1:

Accept

Reviewer 2:

Accept

APPLICANT FEEDBACK

Comments/feedback