



# ATMO ACCESS

Access to Atmospheric Research Facilities

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**ATMO ACCESS**  
Access to Atmospheric Research Facilities

## 1 Introduction

ATMO-ACCESS (Solutions for Sustainable Access to Atmospheric Research Facilities) provided opportunities to access some of the most advanced atmospheric research facilities in Europe. These included ground-based observatories, mobile platforms, atmospheric simulation chambers, and central laboratories for analyses and calibrations. ATMO-ACCESS offered free of charge access to these facilities, including specific training in addition to logistical, technological, and scientific support. Users could also benefit from a financial contribution from ATMO-ACCESS to their travel and local subsistence costs.

This document contributes to the ATMO-ACCESS WP7 (*Developing an effective access program*) objective #3 to “measure success of access calls and optimize the access programme”. It provides a thorough assessment of the access programme and recommendations to sustain access of external users to atmospheric research infrastructure facilities in the future.

This assessment is based on a series of key performance indicators (KPIs) developed under previous tasks (ACTRIS-PPP MS26 “Definition of Key Performance Indicators related to ACTRIS service provision” [1], ATMO-ACCESS D7.1 “Interim Evaluation Report on Access Programme” [2]). Two series of KPIs described the requested and provided access on the one hand, and the applicants and users on the other hand.

This report focuses on recurrent Calls #1 to #7 (Figure 1). Calls 1, 3, 5 and 7 were general calls with no specific restrictions. Calls 2, 4 and 6 had to support European Green Deal actions, to deal with remote or hybrid (physical + remote) access to facilities, and to involve multi-disciplinary research, respectively. Pilot calls targeting specific users (private sector) or access drivers (training) were evaluated in another document (ATMO-ACCESS D6.5).



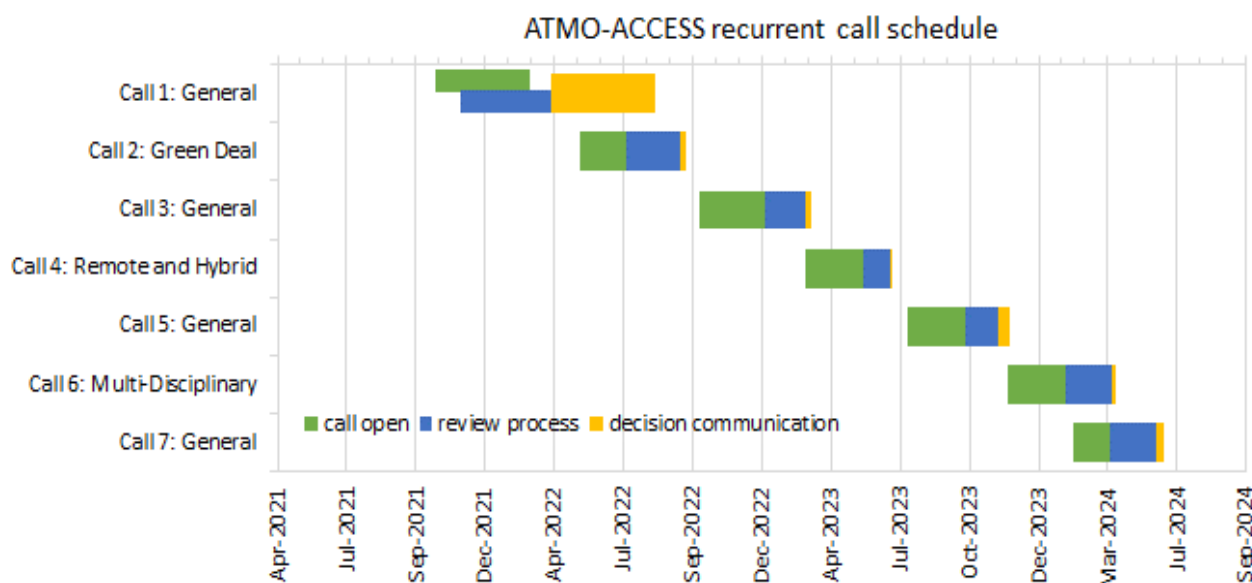


Figure 1: time schedule for recurrent calls #1 to #7 from the ATMO-ACCESS project kick-off.

## 2 Technical considerations

This assessment is based on overall and call-specific statistics. The accuracy and representativeness of these statistics can be slightly affected by the lack of information provided by applicants (2.1), and (exceptionally) the ambiguity of the application forms (2.2). The non-systematic use of pre-defined vocabulary did not facilitate the automatic analysis of the data (2.3).

Specific calls 2 (European Green Deal), 4 (remote or hybrid access) and 6 (multi-disciplinary research) are labelled 2GD, 4 RH, and 6 MD in call-specific charts to facilitate their interpretation.

### 2.1 Lack of information provided by the applicants

A small number of applicants (< 1%) did not always answer simple questions regarding e.g. their profile, nationality, or their previous access to the requested facility(ies).

### 2.2 Ambiguous question

From Call 5, the leader of the team (PI) applying for access was asked to state whether *"the PI or some of the group members had already accessed the facility"*. It was therefore not specifically determined whether the PI was a new user or not, which means that the reported number of new users is a lower limit from Call 5 onwards.



## 2.3 Predefined vocabulary

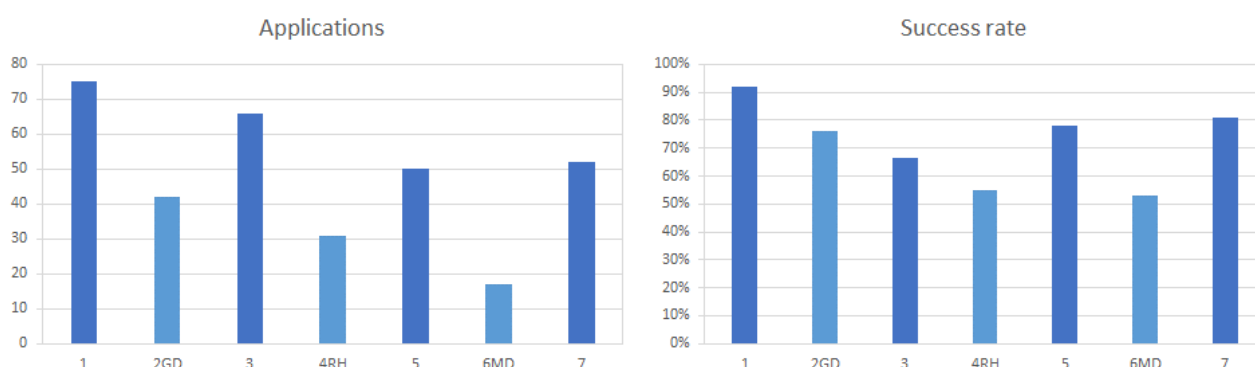
The use of free text instead of pre-defined vocabulary in applications did not enable automatic analysis of e.g. applicants' nationality.

# 3 Achieved KPIs targets

## 3.1 Access metrics

### 3.1.1 Application number and success rate

Calls #1 to #7 received in total 331 applications. General calls (1, 3, 5 and 7) all triggered more applications than specific calls (2GD, 4RH, and 6MD). The apparent decreasing trend in the number of applications to call #1 to #7 was not statistically significant at the 95% confidence level. The decreasing trend in the number of applications to specific calls probably came from their increasing stringency from Green Deal related, to Remote and Hybrid access limited, and multi-disciplinary research oriented.



*Figure 2: Number of applications and success rate for calls #1 to #7.*

The success rate was also lower for specific calls (64%) than for general calls (80%) because applications' relevance to specific calls was obviously an additional selection criterion. There was no major change with time in the success rate during the access programme. The overall application success rate was 75%, 1% of the applications being deemed unfeasible by host facilities, 3% deemed ineligible by the ACTRIS (Aerosol, Clouds, and Trace-gases Research InfraStructure) Service and Access Management Unit (SAMU), and 21% rejected during the reviewing process.



Overall selection process output

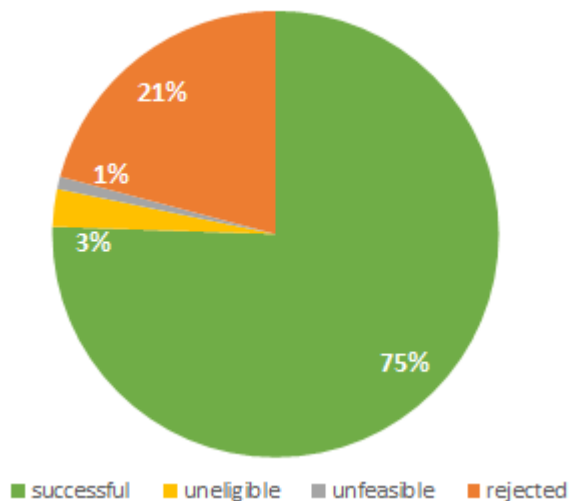


Figure 3: overall output of the selection process.

### 3.1.2 Drivers

Figure 4 shows that the main driver of access requests was “Research and Innovation” (79%), far ahead of “Technical Development” and “Training” (9% and 10%, respectively). “Market-related” needs triggered 2% of the applications only. “Research and Innovation” and “Technical Development” driven requests were similarly successful (71-77% success rates), while “Training” driven applications were less (63%). In contrast, the 8 applications driven by “Market-related” needs were all successful (100%).

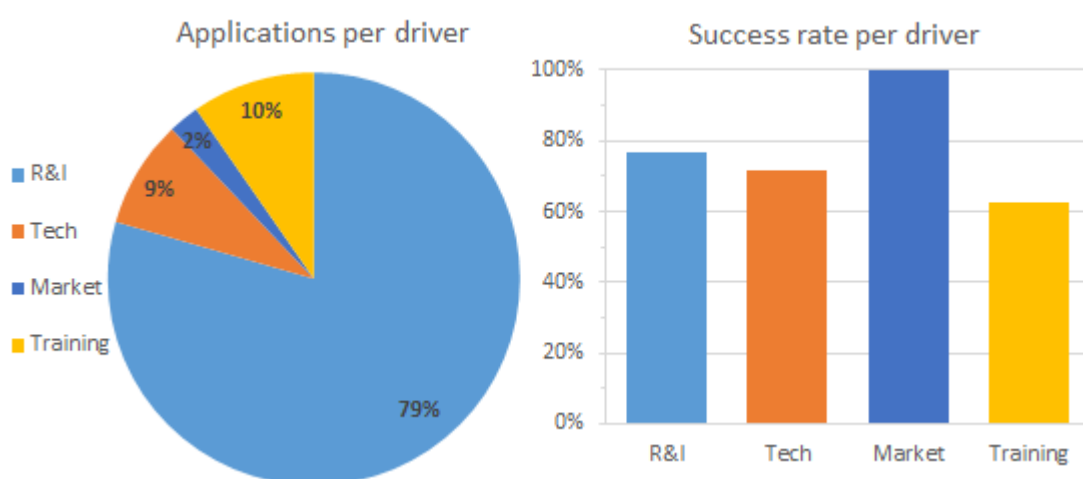


Figure 4: Overall request percentages for access driven by Research and Innovation (R&I), Technical development (Tech), Market and Training needs, and overall success rate for each driver.

During the access programme, there was no significant trend in the distribution of the application drivers (Figure 5). “Research and Innovation” constantly remained the core driver (68-88%), while other drivers’ shares were variable (0-22%). Notably, there were no longer “Market-Needs” driven applications from Call #3 onwards, probably because the private sector applied to the *ad hoc* Pilot Call (see Deliverable 6.3 [3]). No trends were observed in the success rates either. “Research and Innovation” driven applications were evenly successful, while the success rates of “Technical Development” and “Training” driven applications were randomly variable.

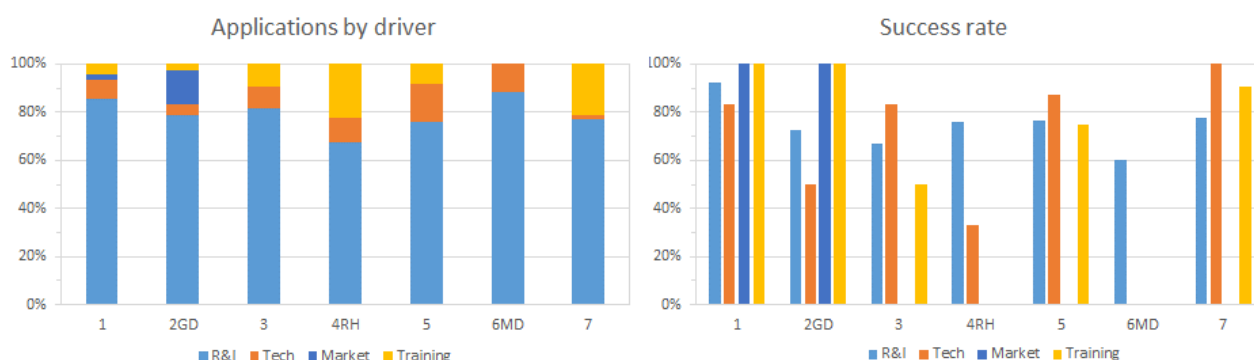


Figure 5: evolutions of the application shares and success rates by driver (see legend key in Figure 4 caption) during the access provision programme.

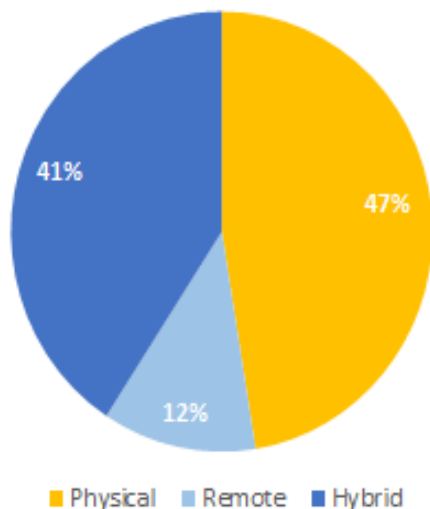
### 3.1.3 Access types

Figure 6 shows that applications for physical access to facilities were the most numerous (47%), almost at par with requests for hybrid (combination of physical and remote) access (41%), but far ahead of applications for remote access only (12%). Requests for remote access were slightly more successful (85%) than others (72 – 76%). Eventually, the number of successful applications were 115, 103, and 33 for physical, hybrid, and remote access, respectively.





Applications per access type



Success rate per access type

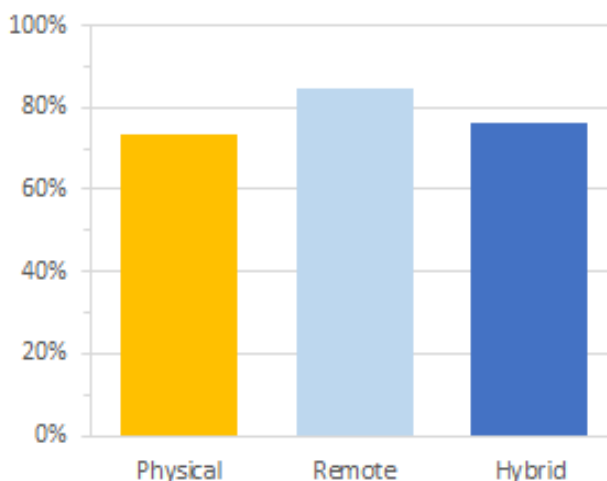
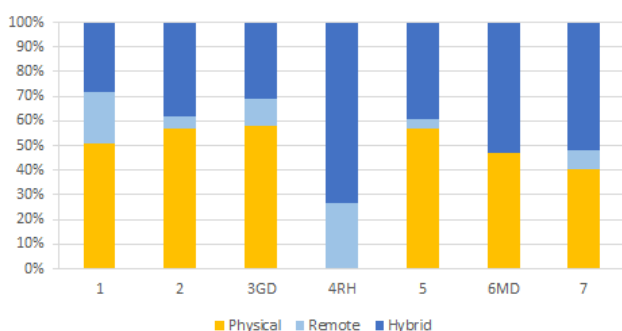


Figure 6: distribution of applications across the 3 access types and success rates.

There was obviously no application for physical access under Call #4, which was limited to remote and hybrid access (Figure 7). The evolution of applications suggests that hybrid access became more and more popular instead of physical access, reaching > 50% towards the end of the programme (Call #6 and Call #7). The success rates for physical and hybrid access were similar under each call. The success rate for remote access was similar or greater than for the other types under each call but Call #7, where it dropped to 50%.

Applications per access type



Success rate

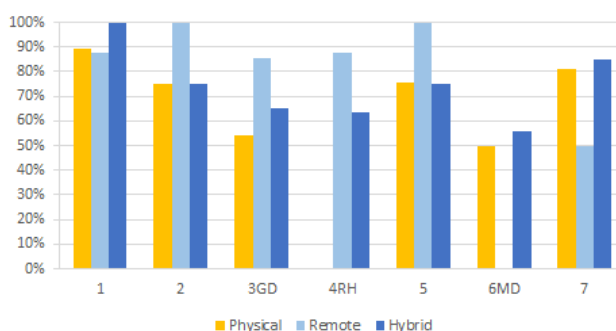


Figure 7: evolutions of the application shares and success rates by access type during the access provision programme.

### 3.1.4 Facility types

Figure 8 shows that the most requested facilities were by far atmospheric observatories (54%), followed by atmospheric simulation chambers (21%), central laboratories and mobile platforms (12% and 7%, respectively). Success rates were similar across the various types of facilities (60





– 72%), showing that the selection process was not significantly biased towards a specific type of facility.

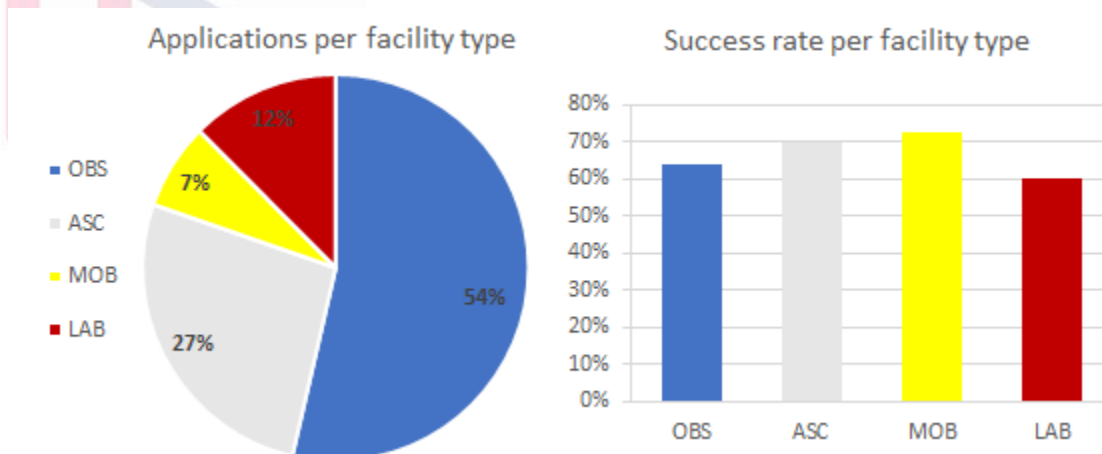


Figure 8: Overall request percentages for access to observatories (OBS), simulation chambers (ASC), central laboratories (LAB) and mobile platforms (MOB), and overall success rates.

Observatories remained the most requested type of facility (50 – 62%) during the whole access programme (Figure 9). Requests to access simulation chambers were quite stable (20 – 33%), in contrast to less requested types of facilities (mobile platforms and central laboratories). Success rates were very similar across the various facility types for the general calls, and more variable (up to a factor of 2) for specific calls (Figure 9).

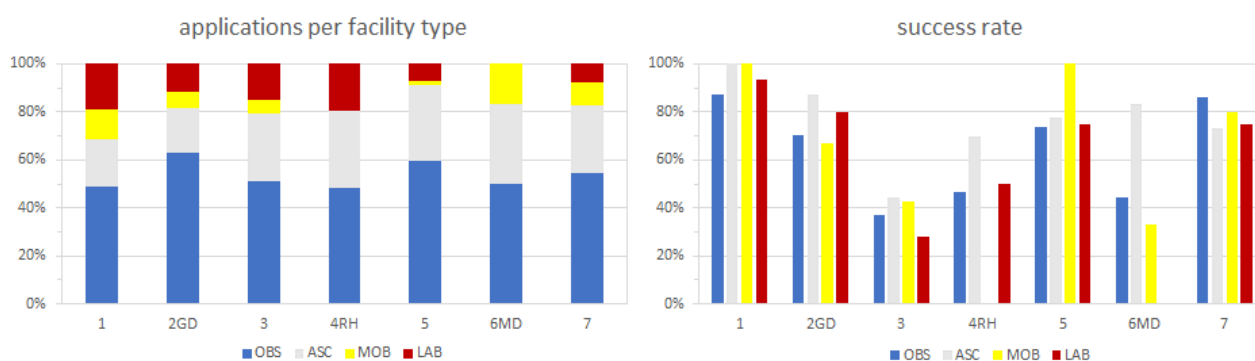


Figure 9: evolutions of the application number and success rate per facility type during the access provision programme.

### 3.1.5 Host facilities

Access to 52 different facilities was requested: 29 observatories (OBS), 14 atmospheric simulation chambers (ASC), 8 central laboratories (CL), and 5 mobile platforms (MOB). 7 of the 29 accessible observatories (28%) got more than half (52%) of the requests (and accesses), while 10 simulation chambers (70%) got a similar number of requests (6-10) and accesses (3-7), although the most requested simulation chamber drew twice as many requests than the

second one. A single central laboratory got close to half of the total CL access requests, and more than half of the successful requests. Within each facility category, success rates ranged across the various facilities from 50 to 100% for OBS, 50 to 86% for ASC, and 60 to ~85% for both CL and MOB. Facilities requested by only 3 applications or less were not taken into account in these ranges.



Figure 10: number of applications requesting access to each facility, and success rates. Dark blue = observatories, light grey = simulation chambers, dark red = central laboratories, and yellow = mobile platforms. Success rates are deemed not statistically significant for application numbers < 4.

## 3.2 User metrics

### 3.2.1 New vs. recurrent users

Across the whole access programme (Calls #1 to #7), 75% of the applicants for access were new users (Figure 11). In total, 883 users were granted access to at least one facility, among which 667 new users. The success rates for new and recurrent users were similar (82% vs 79%, respectively).

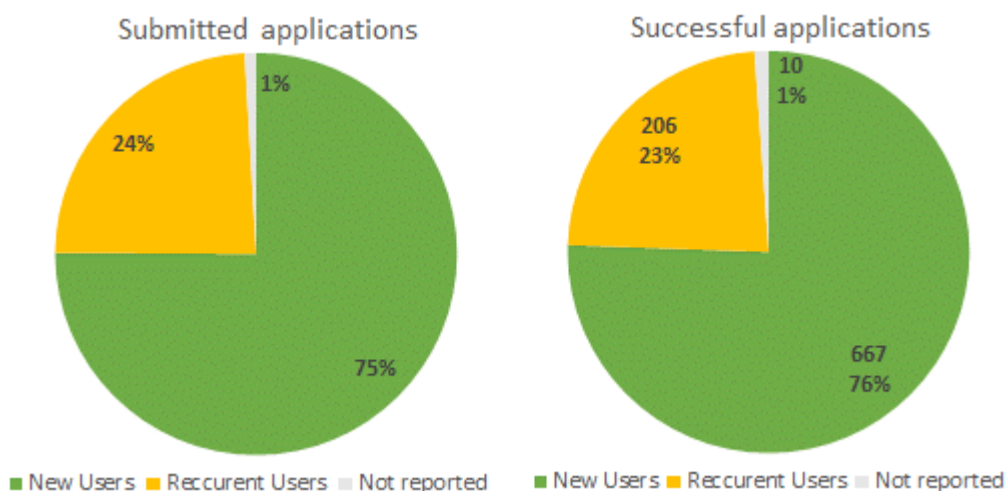


Figure 11: distribution of submitted and successful applications across new and recurrent users.

The fraction of new users was minimum for Calls 4, 6 and 7 (64 – 68%), and maximum for Call 3 (82%), but there was no significant trend in the evolution of this fraction across the access programme (Figure 12). New and recurrent users' success rates were similar under each call, except for Call #6 (Multi-Disciplinary research focused) for which new users were more than 3 times as successful as recurrent users; it is likely that most applicants coming from different fields (i.e. not atmospheric science) were new users.

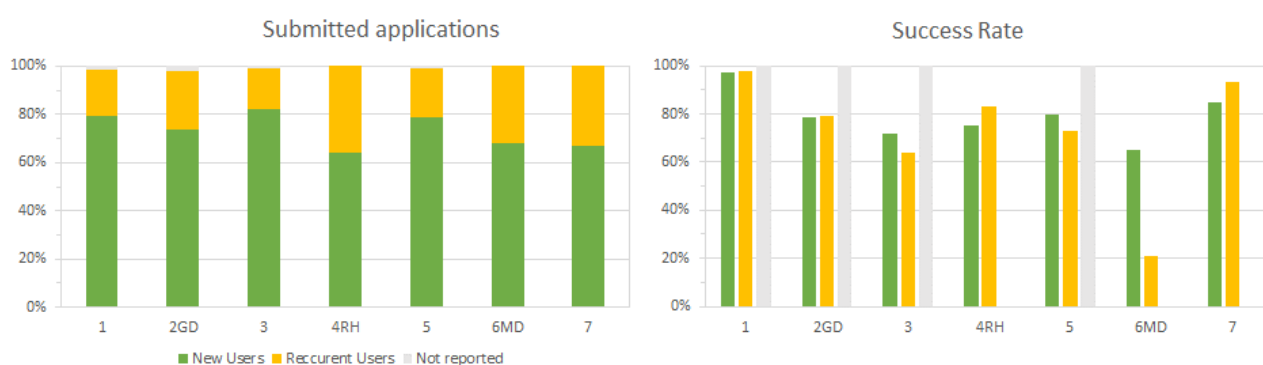


Figure 12: evolution of the fraction of new vs recurrent users Call #1 to Call #7, and success rates.

### 3.2.2 User Gender

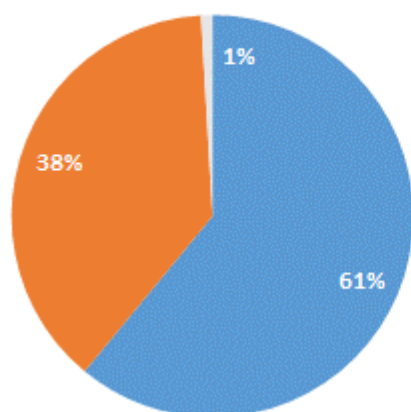
The gender of all users listed in submitted and successful applications was evaluated. Overall, the gender balance was not achieved with a male: female mix of 61:38 for both submitted and successful applications (Figure 13). Notably, the success rate of males and females was exactly the same (81%). This shows that the selection process did not lead to any gender-based discrimination.



Relatively to the total number of applicants, there were ~10% more males being team leaders than females.

**Submitted applications**

■ Male ■ Female ■ Not reported



**Successful applications**

■ Male ■ Female ■ Not reported

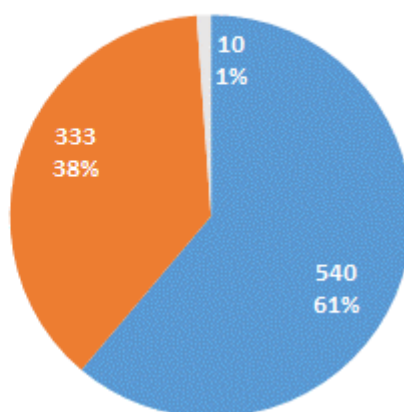


Figure 13: distribution of submitted and successful applications according to user gender.

There was no significant trend in the applicants' gender from Call #1 to Call #7, or in the success rate of males or females either (Figure 14). However, 4 times as many males than females were granted access under the multi-disciplinary research focused Call #6 due to both a double number of applicants and a ~double success rate.

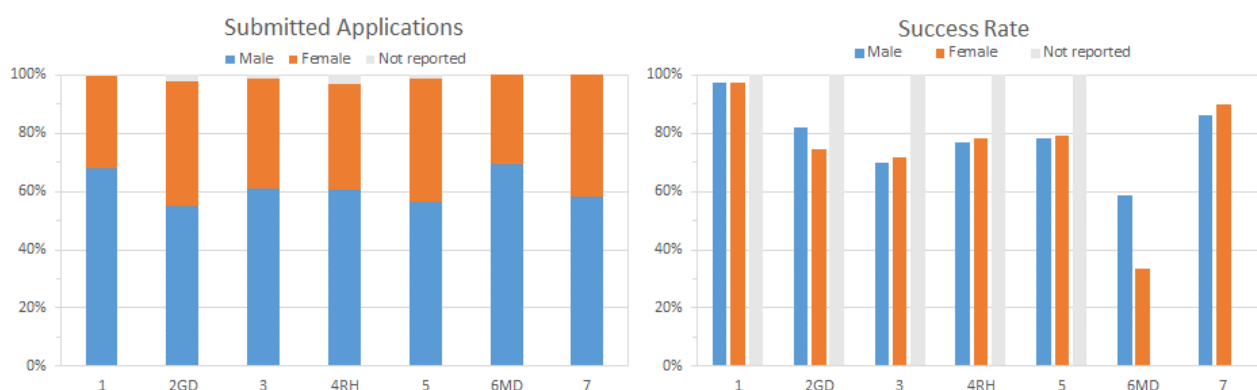


Figure 14: evolutions of the applying team leader gender and success rates from Call#1 to Call #7

### 3.2.3 User profile

Applicants were asked to describe their profile according to a list of terms defined by ATMO-ACCESS (Figure 15). The majority of applicants (56%) were expert scientists, while very few (<1%) stated to be early career researchers or holding a post-doctoral position. Graduated students (29%) were more numerous than undergraduate students (4%), while technicians and engineers accounted for 9%. These proportions were remarkably identical when considering successful applications, which means that the success rates for all 5 categories were equal.

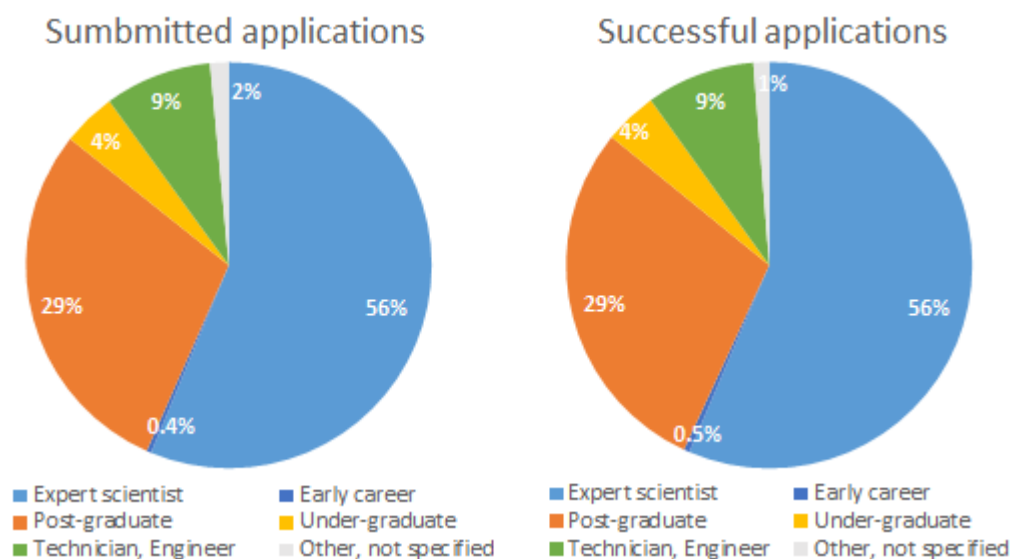


Figure 15: distribution of applicants and users according to their profile.

There were no significant changes in the distribution of the different user profiles across the access programme (Figure 16). Undergraduate students' success rate was more variable than others, probably because they were much less numerous.

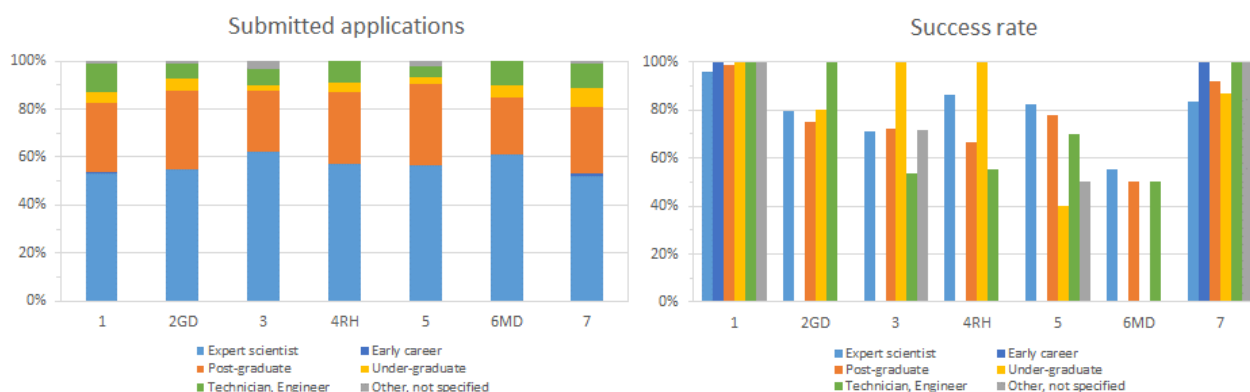


Figure 16: evolutions of the applying team leader profiles and success rates from Call#1 to Call #7

### 3.2.4 Users' Nationality

All applicants' citizenship covered 64 countries across the world (counting double citizenships), mainly in the EU (59%), followed by non-European countries (22%, of which China 5% and USA 4%), and European non-EU member countries (14%, of which UK 7%). Compared to the other EU Member States and considering their population, Widening EU Member States were under-represented by a factor of ~3, not only due to the absence of applicants from Malta and the Baltic countries, while Widening Associated European countries were under-represented by a factor of 10, despite a significant participation of Turkey (Figure 17). For countries with 5 or





more applicants, success rates ranged from < 50% (Argentina, Tunisia) to 100% (Portugal, Slovenia, Switzerland). Overall, they were identical (81%) for citizens of the EU, of European non-EU countries and of countries outside Europe, which shows that the selection process was not biased towards geographical origins.

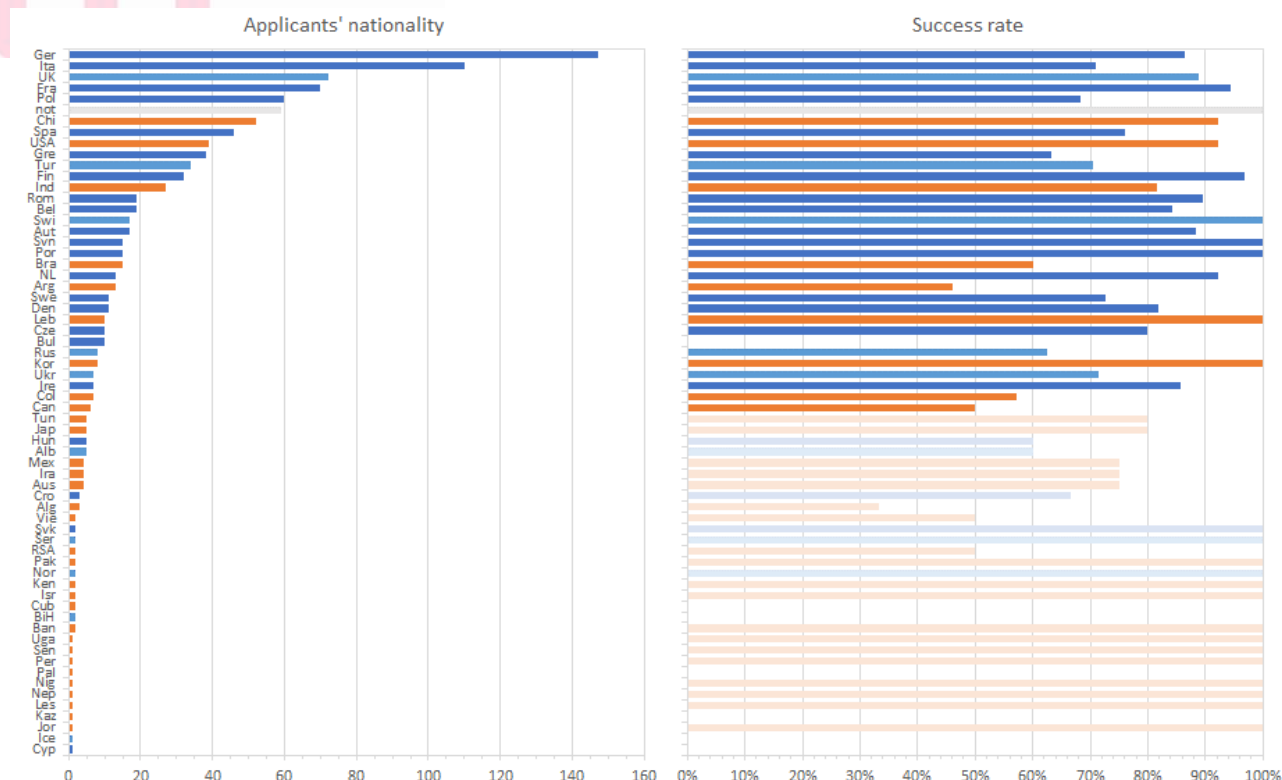


Figure 17: Applicants' nationality and success rate. Dark blue = EU countries, light blue = European non-EU countries, Orange = non-European countries. Countries are indicated according to usual acronyms, three first letters in English, or Alpha-3 codes in case of ambiguity. "not" = not reported. Success rates are not statistically significant for applicant numbers < 6 (light colour).

### 3.2.5 Affiliation institution status

Statistics on institution status were based on all applicants' affiliation. It was deemed to represent better the institutions supporting the applications (through e.g. shared costs). The institutions to which applicants were affiliated were mostly universities (62%), followed by public research institutions (31%), and the private sector (small and medium enterprises, other private and industrial organizations, 7%). These fractions were nearly identical when users only (successful applications) were considered (Figure 18). This means that success rates for applicants from universities (83%), public research institutions (78%), and the private sector (88%) were similar.

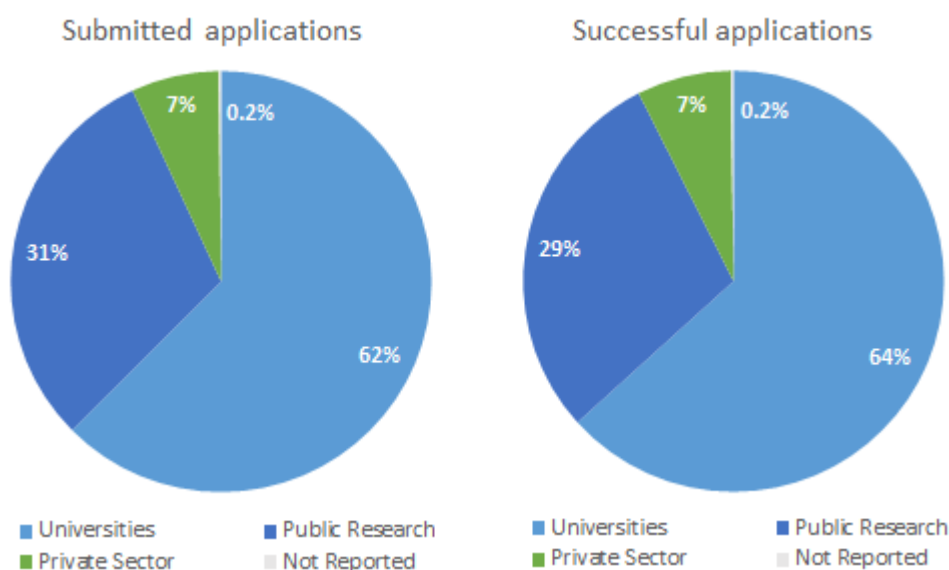


Figure 18: distribution of applicants' (submitted applications) and users' (submitted applications) institution status

For each call, most applicants were affiliated to universities (52-79%). Staff from the public sector (universities + public research organizations) accounted for 82 – 100% of all applicants across calls #1 to #7. The success rate of applicants from universities and public research organizations were generally similar, except for Call 4 - remote and hybrid access (universities more successful) and call 6 - multi-disciplinary research (public research organizations were more successful). Applicants from the private sector were mostly more successful than applicants from the public sector for the calls (# 1, 2, 3, 5, 7) where they applied (Figure 19).

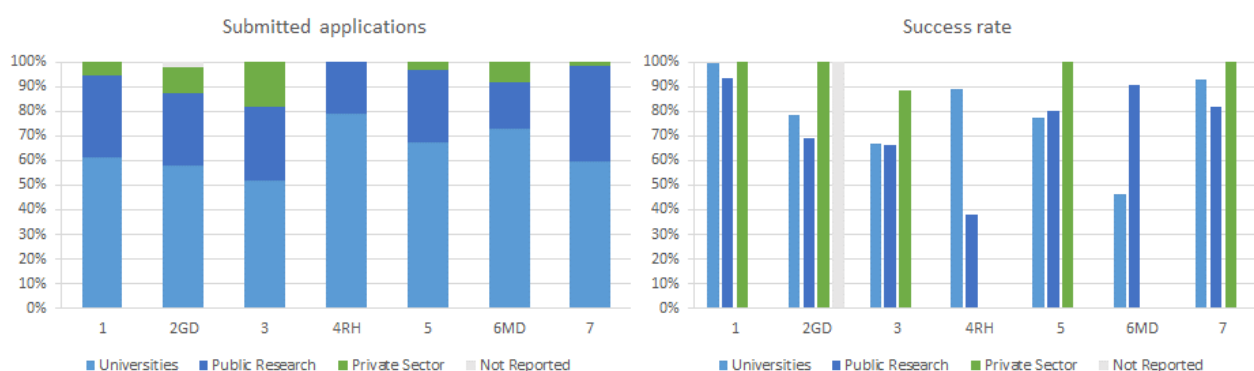


Figure 19: evolution of applicants' institution status and success rate across the access programme

### 3.2.6 Research field

Applicants were asked to state their field of research from the list defined by the European Commission (multiple choice possible). As expected, 82% ticked "Environmental sciences - Atmospheric domain" (ENV-A) as one of their fields of research (Figure 20). The other fields





mentioned by at least 1% of the applicants were “Environmental sciences” in the Hydrosphere (1%), Lithosphere (3%), and Eco-biosphere (2%) domains, Chemistry (4%), Biology and Medicine (2%), and Engineering & Technology (5%). These percentages were not much different when considering successful applications only (users), meaning that success rates for applicants from the various fields of research were similar (range 69 – 93%, of which 73% for ENV-A).

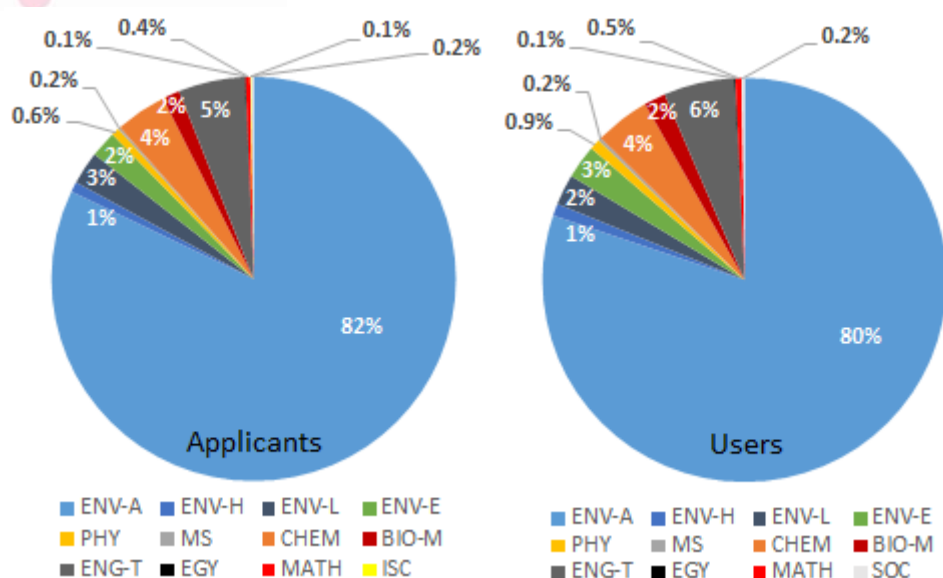


Figure 20: Applicants' and users' (successful applicants) fields of research. ENV-A = Environmental sciences - Atmosphere, ENV-H = Environmental sciences - Hydrosphere, ENV-L - Environmental sciences - Lithosphere, ENV-E - Environmental sciences - Eco-and Biosphere, PHY = Physics and Astronomy, MS = Material Sciences, CHEM = Chemistry, BIO-MED = Biological and Medical sciences, ENG-TECH - Engineering and Technology, EGY = Energy, MATH = Mathematics, ISC = Information Sciences and Communication.

Across Calls #1 to #7, applicants from the “Engineering & Technology” field were always presents, while chemists appeared from Call #3 (Figure 21). As expected, Call #6 dedicated to multi-disciplinary research attracted many more applicants from various fields (Chemistry: 17%, Environment-Lithosphere and Engineering & Technology: 14% each), although Environment-Atmosphere still dominated (37%).

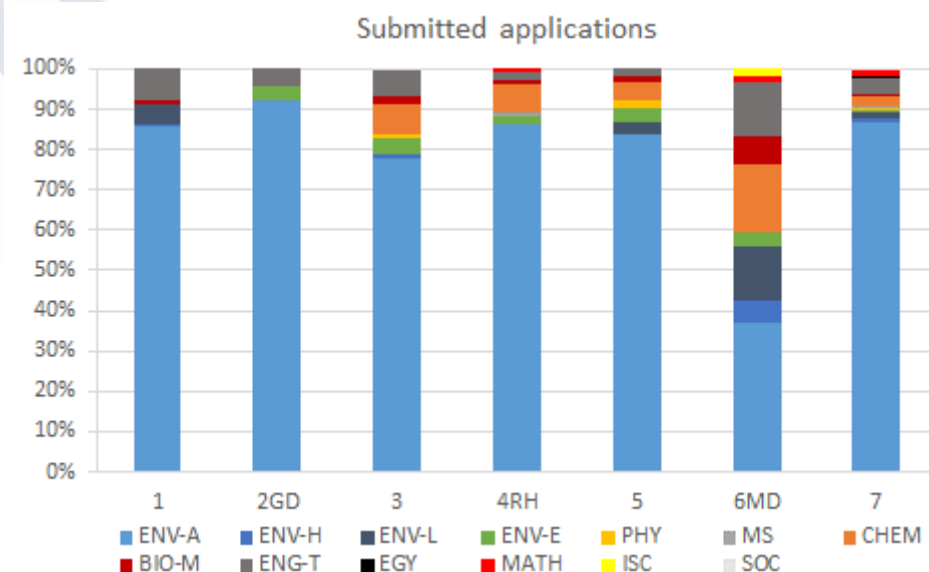


Figure 21: fields of research stated by applicants to each call (#1 to #7). Legend key is provided in Figure 20.

## 4 Evaluation of additional KPIs

### 4.1 Selection process duration

Applications to Call #1 (open from 28/10/2021 to 28/02/2022) were evaluated as and when they were submitted from November 2021, and the time elapsed between the application submission and the communication of the decision (accepted / rejected) is indicated in Figure 22. From Call #2 onwards, the application review process started as soon as the call was closed. The review process took 35 (Call 4) to 70 days (Call 2). There was no reduction in the duration of the selections process from Call #2 to Call #7. Call #4 received a limited number of applications (31), which helped the review process faster. Only Call #6 received less applications (17), but its multi-disciplinary aspect made it more complex to get reviews completed. From Call #2, the time elapsed between the call closure and the communication of the selection decision to applicants ranged from 3 to 14 days (Figure 22), primarily depending on the availability of the Strategic Trans-national and Virtual Access Board (STVB) to attend the selection meeting. Final decisions were communicated to applicants online within a couple of days after the selection meeting.



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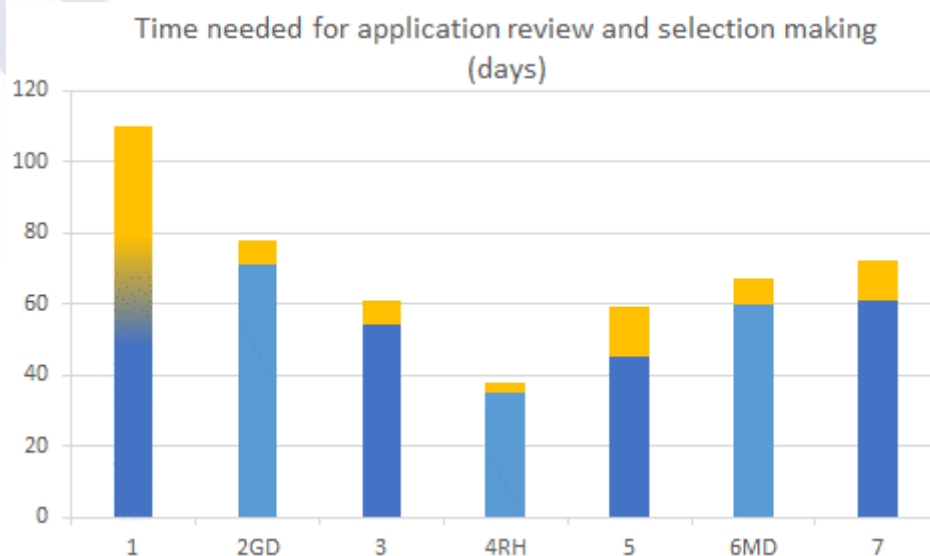


Figure 22: time needed for completing the review process (blue) and the selection process (yellow)

## 4.2 Satisfaction assessment

Satisfaction survey questionnaires were filled in by successful team leaders only, which means that the current satisfaction level assessment might be biased high. However, with a 49% response rate to the questionnaire, its output can be considered representative of users' satisfaction level.

### 4.2.1 Access process

Applicants' feedback regarding the overall application process is evaluated in Deliverable D2.4 [4]. It shows high ratings regarding guidance (4.3/5), application practicalities (4.1/5), and the overall service provided by ATMO-ACCESS (4.7/5).

### 4.2.2 Facility services

Users were highly satisfied about the services provided by the host facilities across the whole access program, with satisfaction indices well above 4.5 for the organizational, scientific, technical, logistic and overall services (Figure 23). Only administrative services (including the reimbursement of travel & subsistence expenses) were slightly less appreciated (4.4), which probably reflects scientists' aversion to administrative affairs.



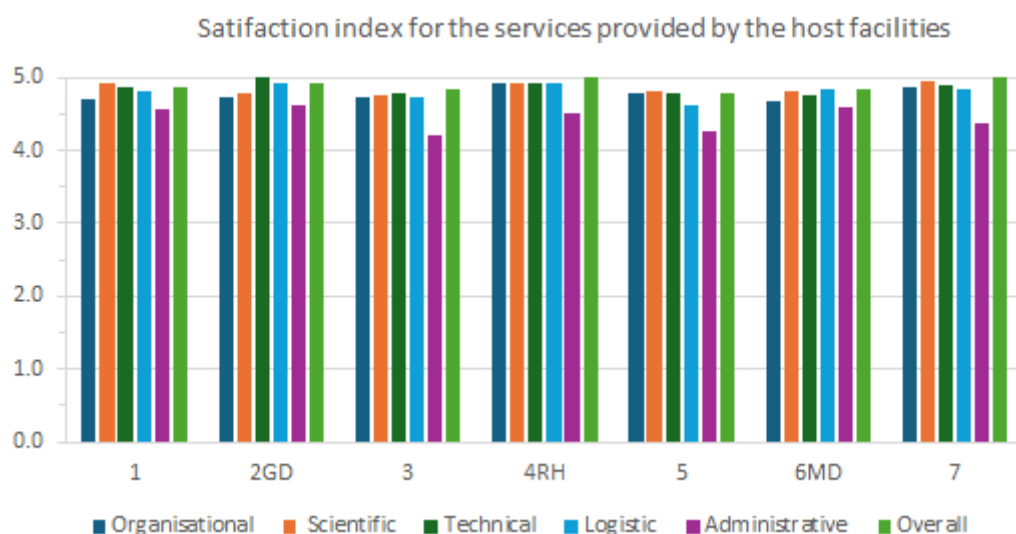


Figure 23: satisfaction indices regarding the services provided by the host facilities.

## 5 Assessment of the application review process

The evaluation by independent reviewers from the Access Evaluation Panel (AEP) of the applications for getting access to facilities was the most critical step in the selection process since (1) the selection was primarily based on these evaluations and (2) it was not fully under ATMO-ACCESS project's control.

The AEP was built up and functioned as described in ATMO-ACCESS milestone 40 [5] and in the dedicated Terms of Reference [6]. It consisted of 113 different experts by the end of the project. The initial plan was to have each application reviewed by 3 members of the AEP. This would have led to an average of almost 9 applications to be reviewed by each of them during the review periods (~13 months in total). This proved to be too demanding on the evaluators' side, and only 24% of the applications eventually got three reviews from the AEP. Most of them (69%) got two. In the few cases (12%) where applications were reviewed by less than 2 members from the AEP, members of the STVB took over so that each application got at least 2 reviews.

Despite these difficulties, the application review process did not degrade with time, and 86 – 100% of the applications were reviewed by at least two members of the AEP during the course of the project with random variations but no decreasing trend (Figure 24).

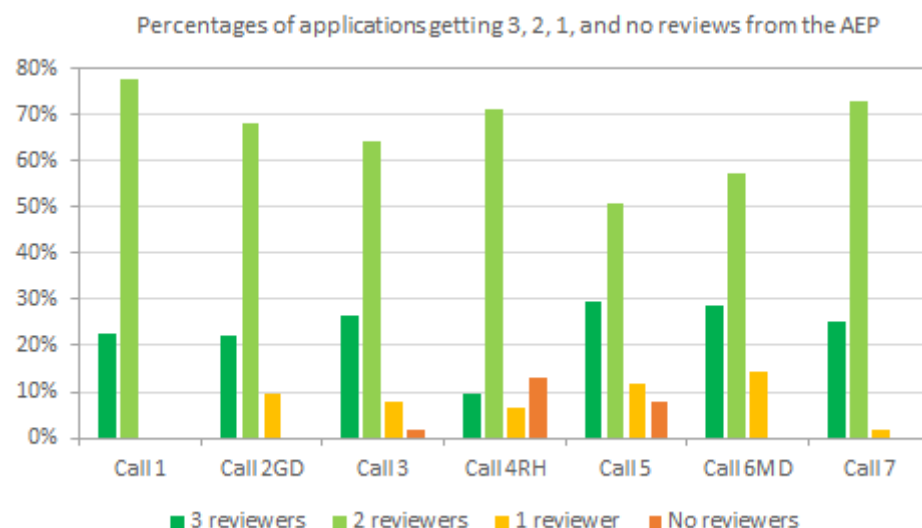


Figure 24: applications reviewed by 3, 2, 1, and no reviewers from the Access Evaluation Panel for Calls 1 – 7.

## 6 Recommendations

Based on this analysis, specific calls for access should be continued, albeit being less popular than general calls. They can pull up the use of atmospheric research infra-structures (RIs) towards long-term targets like reducing RIs' use carbon footprint, breaking research silos, or increasing atmospheric research societal relevance.

Also, the selection process should be tuned so that the success rate for specific calls gets similar to the success rate for general calls.

More specific recommendations are detailed below:

### 6.1 Recommendations regarding Atmospheric RI attractiveness

- To maintain RIs' attractiveness high, the application process shall be as light and smart as possible. This includes e.g. that applicants do not have to provide information that they had already provided before in case of recurrent access requests (~25% of the cases), that they can tick various options from drop-down menus instead of typing free text, and can find on-line help from the web-based application forms.
- Access to atmospheric RIs by under-represented public authorities and the private sector, as well as for training services should continue to be supported by specific actions in the future.
- Funding for access should remain a priority for RIs in the future. In order to have a long-term sustainable funding strategy, sources can and should be diversified. Examples of possible pathways are subsidised or full user fees, EU funding, RI dedicated access programme integrated in the financial plan.



## 6.2 Recommendations regarding the application selection process

- The selection process primarily based on the evaluation of applications by external reviewers has proved to be fair (unbiased) and should be continued. It should be optimized to be fast, transparent and efficient.
- The points attributed based on each selection criterion should be clearly visible from the application form. As it was done in ATMO-ACCESS, in the future, feedback shall always be provided to applicants in case of rejection or non-eligibility.
- All the practical information requested by the applicants should be machine-readable (pre-defined vocabulary) and stored in a database for future fast assessment.
- Application forms where pieces of information are missing should not be submittable.
- As tested in ATMO-ACCESS, it is essential that the feasibility of the work described in applications is checked by the host facility before the review process starts. In the future, a significant part of the application evaluation mark could then be attributed automatically and contribute to push up applications favouring other aspects like gender balance, access of new users, of early-career researchers and students, of citizens from Widening EU member states, Widening Associated European countries and developing countries, etc. However, at least 70% of the final mark should come from the application review by human beings, until artificial intelligence can do the job better. This shall include a part attributed by the selection committee to harmonize the marks given by different reviewers.

## 6.3 Recommendations regarding future KPI for assessing the access programme to Atmospheric Research Infrastructures

- The set of KPIs developed under previous tasks (ACTRIS-PPP MS26 “Definition of Key Performance Indicators related to ACTRIS service provision” [1], ATMO-ACCESS D7.1 “Interim Evaluation Report on Access Programme” [2]) proved to be efficient for analysing the access programme and should be kept as a reference for future access analysis in similar projects. The time elapsed between the closure of the call (or the date of application in case of continuously open call) and the communication of the selection committee decision (accepted/rejected) could be an additional KPI indicator.
- Some of the categories (“Research and Innovation” as driver, “Expert scientist” as profile, “Universities” as home institution, “Environmental Sciences – Atmospheric Domain” as field of expertise) largely dominate (as access driver, applicant profile, home institution, and field of expertise, respectively) and could be refined for a more precise monitoring of the access demand and provision.





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However, for future projects one may consider setting KPI targets, against which the evolution of RI's performance in providing open access to external users could be assessed.

## 7 References

- [1] Sabine Philippin, Rosa Maria Petracca Altieri, Carmela Cornacchia, Ariane Dubost, Giuseppe Gargano, et al. ACTRIS PPP MS26: Definition of Key Performance Indicators related to ACTRIS service provision. CNRS. 2019. [\(hal-04619593\)](#)
- [2] ATMO-ACCESS Deliverable 7.1: "[Interim Evaluation Report on Access Programme](#)"
- [3] ATMO-ACCESS Deliverable 6.3: "[Proposed TNA pilots for innovators in technology](#)"
- [4] ATMO-ACCESS Deliverable 2.4: "[Report on success of the communications actions based on strategies implemented for the pilot access calls including recommendations and best practices](#)"
- [5] ATMO-ACCESS Milestone 40: "[Description of application, review and selection process for TNA to ATMO-ACCESS facilities](#)"
- [6] ATMO-ACCESS "[Terms of Reference for the ATMO-ACCESS Access Evaluation Panel](#)"

