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WHAT FUTURE FOR THE FRENCH ASTRONOMICAL PATRIMONY? THE CASE OF PIC DU MIDI

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Abstract. The Pic du Midi Observatory is not the oldest institution among the French historical astronomical observatories, neither does its buildings present any particularly fine architectural school, but Pic du Midi may be regarded as a very successful example of how to preserve historical patrimony. It welcomes tens of thousands of visitors each year with a rich Education and Public Outreach offer, and at the same time, continues science activities at their best. Pic du Midi operation is based on a world unique bimodal organisation. On the one hand, a science administration run by University Paul Sabatier is in charge of science activities, and on the other hand, a public administration is endowed with the task of maintaining buildings in a sustainable fashion with incomes from touristic visits. Thanks to this organisation, Pic du Midi preserves 150 year-long datasets and ancient instruments in many fields of science, allows thousands of visitors to meet with researchers, and learning state-of-the-art science in the doing. In 2021, Pic du midi Observatory is on a dynamic track, growing fast both touristically and science wise. Pic du midi started a major project to perpetuate patrimony: a UNESCO world heritage nomination under cultural and natural outstanding universal value criteria. This communication describes the patrimonial situation of the Pic du Midi in 2021. Interested readers may read the S20 communication on Pic du Midi.

Keywords: observatory, history, social, patrimony

1 Introduction

The observatory of Pic du Midi de Bigorre (2877 m, N 42°56'11", E 0°8'34") is the first high-altitude site in the world (1872). Its history flows throught two world wars, and a fair share of the emergence of the Modern World. Its meteo records span almost 150 years, including temperature, humidity, winds, and ozone measurements. This long history of science observations at Pic du Midi encompasses a broad range of disciplines, readers interested in Pic du Midi history may read Sanchez (2014); Davoust (2014). Among the numerous sciences that Pic du Midi hosted in his history, one may cite Meteorology, Geology, Glaciology, Atmospheric Sciences (Thunder, Sprites, Chemistry), Botanics, Studies of Cosmic Rays, Nuclear and Particle Physics, Medical studies, Earth Magnetism, Radioactivity Studies, Lunar cartography, Small Planets and planetary observations, Studies of galaxies, Cosmology, Stellar Magnetism, Solar studies and Coronagraphy, Ethology, ecology and most recently climate studies. This fantastic wealth of data gathering was produced over the years by rich historical ensemble of instruments, and has demanded summit building to cover most of the summit area. Observations and experiments continue at their best in 2021 thanks to the contemporaneous organisation that emerged in the latest part of the twentieth century. This organisation also offers a unique way to fund patrimony protection, which has become an almost insuperable task for French Universities because of the drastic under funding since 2010. We will describe here the way Pic du Midi works in 2021, with an emphasis on patrimonial management and conclude on the Pic du midi candidacy to UNESCO world heritage.

2 Pic du Midi: 150 years of sciences and more...

One of the most striking observations that a visitor can make when visiting Pic du Midi today is the mix of ancient buildings and domes with state-of-the-art contemporaneous infrastructures and instruments. Pic du

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Midi is both a historical site and a living platform with many national services. The second peculiarity of Pic du Midi, is of course the very fact that thousands people can visit the observatory every year. A wide variety of Education and Public Outreach (EPO) activities are offered for all tastes, from concerts (Piano-Pic Festival, Rock at the summit, etc.) to downhill sports in all seasons, and of course a modern science museum reflecting the past and contemporaneous science activites ongoing at Pic du Midi, a planetarium located in Baillaud Dome (1909), a "HistoPad" tablet will allow interested visitors to discover what Pic du Midi looked like at different epochs since its foundation. The most fortunate visitors, staying one night at the summit, will follow an EPO professional through the science premises of Pic du Midi and discover what and how science observations are performed today. They will stargaze at night with small telescopes installed on the terrace and most important of all from a science perspective, they will participate to the funding of the observatory with their visit fees.

This visitor may figure that Patrimony at Pic du Midi comes in three categories, the first category is made of more traditional science records, books, photographs, old walls, domes and buildings dating back from 1880s to 2021, the second category is connected to the exceptional natural quality of the site that must be preserved, and the third category is connected to the so-called immaterial patrimony of Pic du Midi as a one of the world best example of high-mountain observatories fostering human science endeavour in modern history.

We will come back to Pic du Midi Patrimony in a later section, but let's summarize first Pic du Midi organisation allowing such wide variety of activities and patrimony protection.

Fig. 1. A concert at Pic du Midi.

3 Pic du Midi organisation in 2021

Since 2000, Pic du Midi summit is shared between two independent administrations. Readers interested in the making of such an organisation may read the communication of S20 on Pic du Midi in these proceedings. On the one hand, science activities at Pic du midi are managed by the Observatoire Midi Pyrénées (OMP), component of the University of Toulouse 3 Paul Sabatier. The science staff is shared between CNRS (9 people) and the University (15 people). On the other hand, Pic du Midi EPO activities are fully delegated to a public administration, comprising ca. 40 staff members. Apart from the aforementioned touristic activities, an important duty of the public administration is to perpetuate the long-term science activities at Pic du Midi. Among its supporting activities, access to the summit from La Mongie skying resort, power, water and food supplies, and sanitary infrastructures are central to the observatory science capabilities. The two administrations run separate budgets, their management is independent.

This bimodal organisation is very efficient for fund raising, because each partner pursues distinct objectives. Hence, any funding administration knows when money is spent on the public side or the science side. Thanks to this clarification, over the past ten years, about 10 million euros were invested on various science projects, and similar amounts on public infrastructures. In particular patrimony protection has profited from this.

4 Patrimony management at Pic du Midi

Management of the three categories of the Pic du Midi patrimony are covered by various partners.

4.1 Traditional patrimony: ancient science records, books and instruments

The Observatoire Midi Pyrénées created a Patrimony Commission endowed with four tasks: inventory, protection, restoration and valuation of patrimonial collections. At Pic du Midi, emblematic meteo records and other anthropogenic pollution, witnesses of long-term climate evolution, has been ongoing since 1870s, hundreds of photo-magnetograms of our Sun surface, numerous publications of particles physics that used Pic du Midi collider in the 1950s, hundreds of coronagraph time-lapses of Solar activity over many cycles, those examples are few among many that illustrate the richness of Pic du Midi science record patrimony. To this, one may add, old instruments, barometers, heliographs, old telescopes (The telescope of 60 cm, given by Italian jewish astronomer G Gentili to thank Pic du midi for hiding him during WW II, is 110 year-old).

Among its activities, The OMP Patrimony Commission has inventoried all Pic du Midi collections and stored most of them in University Libraries or public archives, deposited instruments in museums (ancient clocks in Dupuy Museum in Toulouse, instruments in Pic du Midi Museum). The commission also maintains links with science societies (Soc. Ramond de Carbonière, Bagnères de Bigorre, Soc. Astron. Toulouse), and institutional partners (PATSTEC mission; Université Fédérale de Toulouse). Finally OMP Patrimony Commission manages loans for exhibitions (Prototypes - Arts et Metiers, Fragments de Science Université Toulouse III , Train du Climat, virtual exposition Dauvillier, and virtual Explorer series Explorer, Héliographe de Campbell), organises public talks, training sessions for high-school teachers (Preac "science et société" de 2019 with a workshop entitled "Earth Physics: the Flat Earth)) and participates to national efforts for patrimony protections (ANR RESEED).

4.2 Natural site patrimony: Night sky protection

Another patrimony of Pic du Midi is the natural site quality highly suited for astronomical and environmental observations. Protecting the site quality is central to the future use of Pic du Midi for science. This protection was initiated by François Colas (IMCCE, OPM), responsible of Pic du Midi T1M, immediately supported by University Paul Sabatier (OMP), and soon delegated to the public administration that provided manpower and resources. The idea converge towards creating an International Darksky Association Reserve (RICE in French for Réserve Internationale de Ciel Etoilé: RICE) was launched by The IDA reserve was the first of its kind in Europe in 2013. In 2021, the IDA reserve covers 700 km^2 of core area around Pic du Midi over ca. 200 nearby villages. The key-element to a successful future was to involve, from the beginning, institutional partners (mayors, MP, State), technical experts (Energy Supply administration responsible of developing public lighting for the area), and Pic du Midi partners (scientists, EPO experts). Over the past years, the RICE successfully replaced thousand of light points around Pic du Midi and launched campaigns of night sky protection leading many nearby villages to switch-off public lights midnight to 5 am.

4.3 Immaterial patrimony: UNESCO World heritage

The Pic du Midi was the first high-mountain observatory to be built in the world, and one of the last pioneering site still active in the XXIst century. Its long science adventure and history of 150 years generated a rich patrimony. The fact that the summit is a connecting site between a larger public and scientists is very unique in the world today. All these characteristics argue for an outstanding universal value under criteria III and IV (https://whc.unesco.org/en/criteria/) for a nomination to UNESCO World Heritage. The public administration, the University Paul Sabatier and the State prefect work together to make that happen in the coming years. If the site is nominated, it will attract international visitors and preserve its science activities for the foreseeable future. Becoming a UNESCO World Heritage is a long two-step process. First, the site must join the French national indicative list. This shall happen in the late months of 2021, and the second step consist in building a site management plan detailing how partners will work together to protect the site. An important point of this UNESCO World Heritage is that science activities are at the heart of the outstanding universal value, they are what needs to be protected and developed, the risk of "fossilising" the site is null; the summit historical artefacts are expected to evolve to support this universal science adventure.

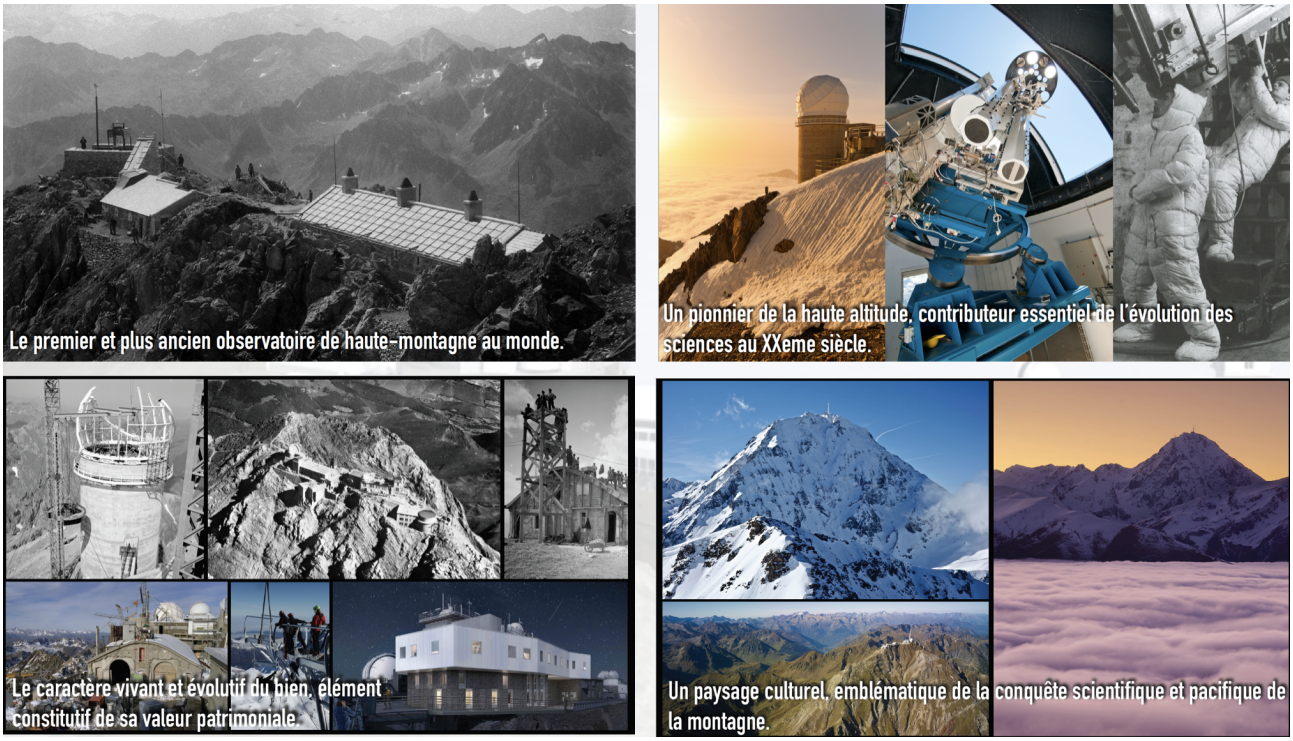

Fig. 2. Pic du Midi outstanding universal values for UNESCO world heritage patrimony candidacy.

5 Conclusions

In 2021, Pic du midi bimodal organisation is optimised for the site protection. Thanks to this very unique way of managing the observatory, we are confident that our generation can pass on future generations this extraordinary patrimony. Already rich of 150 years of science observations, ongoing projects both on the science and public sides allow us to claim that the best is to come at Pic du Midi Observatory. But this will only become a reality under two conditions, (i) visitors must continue to support the science activities, and (ii) the funding agency CNRS and University Paul Sabatier must continue to invest in people at the summit. Maintaining such an high-mountain observatory demands dedicated and expert staff at the summit. Until today, those two conditions were filled, let's hope this will continue in the coming years!

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