

GERMANY

Messel Pit Fossil Site

Brief description

Messel Pit is the richest site in the world for understanding the living environment of the Eocene, between 57 million and 36 million years ago. In particular, it provides unique information about the early stages of the evolution of mammals and includes exceptionally well-preserved mammal fossils, ranging from fully articulated skeletons to the contents of stomachs of animals of this period.

1. Introduction

Year of Inscription 1995

Agency responsible for site management

- Hessian Ministry of Science and Arts
Rheinstrasse 23-25
D - 65185 Wiesbaden
website: Hessian Ministry of Science and Arts
www.hmwk.hessen.de/messel/

2. Statement of Significance

Inscription Criteria N (i)

Justification provided by the State Party

The Messel Pit fossil site is the only one of the major sites to provide evidence in such quality and abundance of the crucial explosive evolution of the mammals that occurred primarily during the Eocene and eventually went on to bring about the emergence of man. The pre-eminence of the Messel Pit fossil site thus derives from its universal importance as a record of the development of the large vertebrate subphylum, in particular the mammals, and hence ultimately man himself. The finds cover the entire spectrum of the organisms in a biodiversity and quality hitherto unmatched by any other site. Furthermore, Messel is also the only fossil site of this status which remains truly preservable.

As provided in IUCN evaluation

The Eocene ("dawn of new times") Epoch (57-36 mya) was a remarkable period in the evolution of life on earth. This was the time when mammals became firmly established in all the principal land ecosystems. They also re-invaded the seas (eg.

whales) took to the air (eg. bats). During this period of geological time North America, Europe and Asia were in continuous land contact and the partial explanation of current distribution patterns is provided by the fossil record of the Eocene.

The Messel Pit provides the single best site which contributes to the understanding of the middle part of this period. Messel is also exceptional in the quality of preservation, quantity and diversity of fossils. While most fossil vertebrate remains yield only fragments of bone material, Messel offers fully articulated skeletons and the outline of the entire body as well as feathers, hairs and stomach contents. Significant scientific discoveries have and are being made at Messel including studies of the evolution of echolocation in exceptionally well-preserved fossil bats and vital new data on the evolution of the horse. The fossils found here are providing a unique insight into an early stage of mammal evolution when many of the basic steps in diversification were being achieved. But mammals were not the only component of the fauna - birds, reptiles, fish, insects and plant remains all contribute to an extraordinary fossil assemblage. Clearly criterion i, as given in the justification section of the nomination summary, is met.

Committee Decision

Bureau (July 1995): the Bureau recommended that the World Heritage Committee inscribe the nominated property on the basis of criterion (i), considering that the site is of outstanding universal value as the single best site which contributes to the understanding of the middle Eocene, when mammals became firmly established in all principal land ecosystems. The Bureau noted that a geological theme study is underway as part of the framework of a global strategy for natural heritage, which is to be completed in 1996. The Bureau, however, is of the opinion that the significance of Messel is clear and need not wait for the results of this study. Furthermore, the Bureau commended the German Government for their support of the high standards of paleontological research undertaken.

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- Statement of Significance adequately defines the outstanding universal value of the site

Boundaries and Buffer Zone

- Status of boundaries of the site: adequate
- Buffer zone: no buffer zone has been defined
- The outstanding value derives of the rock formation which contains the fossils. Most of the rock formation is buried under the surface. Only the upper part of the rock formation is accessible. This area lies within the former pit which is all fenced in. The surroundings of the former pit are neither part of the World Heritage site nor are they of outstanding or even any value. The fence and the fact that most of the rock formation is deeply covered in the ground gives adequate protection to the site without a buffer zone
- No change to buffer zone proposed by State Party

Status of Authenticity/Integrity

- World Heritage site values have been maintained

3. Protection

Legislative and Administrative Arrangements

- 1st Land Use Plan (1983) – no longer enacted; 2nd Land Use Plan – draft; Building Plan – draft; Landscape plan (2004); All these plans are or will be the basis for the overall development of the site. The protection and preservation of the Messel Pit is guaranteed by an agreement between Land Hesse and the Senckenberg Society for Nature Research, the operator of the mine. Operation is governed by the Federal Mining Act
- The protection arrangements are considered highly effective

4. Management

Use of site/property

- Visitor attraction (entrance fee), national park (or other national protected area)

Management/Administrative Body

- Steering group: marketing the Messel Pit; public and didactic presentation of the fossils found and granting access to the public on behalf of Land Hessen as the owner of the pit; participation in all administrative acts (set-up on 1 May 1995)
- Legally constituted

- Overall management system: management by the State Party; management under protective legislation; management under contractual agreement between the State Party and a third party
- Site manager on full-time basis
- Levels of public authority who are primarily involved with the management of the site: regional
- The current management system is highly effective

5. Management Plan

- No management plan and no management plan under preparation

6. Financial Resources

Financial situation

- Land Hessen, Senckenberg Society for Nature Research
- Sufficient

7. Staffing Levels

- Number of staff: not provided

Rate of access to adequate professional staff across the following disciplines:

- Very good: conservation
- Good: management, education
- Average: promotion, interpretation
- Bad: visitor management

8. Sources of Expertise and Training in Conservation and Management Techniques

- No specialized expertise, training and services on or off-site
- Training needs: guides to improve use of the site for tourism as well as for school classes and teachers to improve the educational value

9. Visitor Management

- Visitor statistics: (automatic registration on the way to the visitor platform). Trend: steady
- Visitor facilities: visitor platform, guided tours within the grounds and visitors on guided tours; three museums within the region
- Visitor facilities needed: visitor centre

10. Scientific Studies

- Risk assessment, studies related to the value of the site, condition surveys, archaeological surveys, visitor management
- Studies of visitor frequency, provenance and formal education were started in May 2004
- The management of the site considers the results of studies and research programmes at the decision-making stage

11. Education, Information and Awareness Building

- No of signs referring to World Heritage site
- World Heritage Convention Emblem not used on publications
- Adequate awareness of World Heritage among: visitors, local communities, businesses, local authorities
- Need for awareness raising: A visitor information centre is planned
- Education strategy
- Events, scientific exhibitions relating to World Heritage status; 10th anniversary of inscription on the World Heritage List in 2006 (linking all palaeontologically relevant World Heritage sites for an International Paleontological week); etc.
- Web site available

12. Factors affecting the Property (State of Conservation)

Reactive monitoring reports

- N/A

Conservation interventions

- Annual excavations, strict control of water level in the pit to prevent landslides on the slopes, fencing all around, mining legislation, restricted access, geological survey and monitoring for risk analysis, protection research planning by the scientific board
- Present state of conservation: adequate

Threats and Risks to site

- Development pressure, natural disasters
- Specific issues mentioned: heavy rainfall in short periods as seen in 2001 indicate that sliding of the slopes will remain a problem under such conditions
- Emergency measures taken: research was undertaken to evaluate the possible increase in slides as well as to give proposals for ad hoc measures
- Timeframe of action: 2020

13. Monitoring

- Formal monitoring programme
- Measures taken/planned: mining regulations

14. Conclusions and Recommended Actions

- Main benefits of WH status: conservation, economic, management
- Strength: further scientific exploration, visitor platform, planned visitor information centre
- Weaknesses of management: environmental - the famous fossils are not visible on the site but embedded in the oil shale

Future actions:

- Improvement of the environment: genesis of Messel Pit is the industrial excavation of oil shale. The future design of the surrounding landscape has to take place in cooperation with the local authorities and the industries in the vicinity
- Responsible authority: local authorities Grube Messel GmbH
- Timeframe: 2020