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Website Soil of the Year
www.boden-des-jahres.de
Deutsche Bodenkundliche Gesellschaft (DBG)
www.dbges.de
Bundesverband Boden (BVB)
www.bvboden.de
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www.itv-altlasten.de
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www.bgr.bund.de/boden
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State Geological Surveys of Germany
www.infogeo.de

Information material
Umweltbundesamt (UBA)
www.umweltbundesamt.de/publikationen
Kuratorium Boden des Jahres
www.boden-des-jahres.de

Aside from water, loess soil stores nutrients and contaminants. These can easily adsorb onto the large surface area of the fine soil particles. In this way, nutrients are available for plants.


Visualizing flow paths in loess soil using food coloring

At the same time, harmful substances may be retained in the soil, which leads to a protection of our groundwater. In order not to overstress the soil and its filter capacity, the infiltrated substances have to be biodegradable. Degradation is performed by microorganisms. Their high activity level in loess soils contributes to a rapid turnover of undesired substances.

A sensitive soul

With all these advantages: such a loess soil is highly sensitive. The material was supplied by the wind, and may as well be (re-) taken away with it – or be easily washed away by water.


Soil erosion by water

As loess may not be formed without a new ice age, we need to conserve it. The best protection against erosion is a year-round vegetation cover and as many hedges and trees as possible.

But what can we do if something is lying under the precious soil that we also want to exploit, such as lignite in many places? If after lignite mining the previously removed loessis reapplied with a sophisticated method, we can succeed in regaining vast landscapes for usage.

On these recultivated areas soils redevelop and fulfill important functions for the ecosystem and landscape hydrology.


Reapplying loess after lignite mining

Loess soil is worth it – because of its excellent features and manifold functions, as a soil it is a

... true jack of all trades.

A soil of high diversity

Many kinds of soils may form from loess – we have described this above. This is also reflected in the soil from the Calenberger Börde which lends its face to our Soil of the Year. The wind-deposited loess at the bottom is affected by groundwater contact as can be seen by the rusty spots. Water-deposited and man-moved loess from the near surroundings is located on top. This explains the remains of red bricks in the soil. Two plough horizons lie on top of each other, the topmost with straw ploughed in. Despite the fact, that the relocated loess has been placed there only recently, Luvisol formation has already started. Earthworm burrows show the high activity of soil organisms.

SOIL OF THE YEAR
Loess Soil

2021

Loess Soil – Soil of the Year 2021

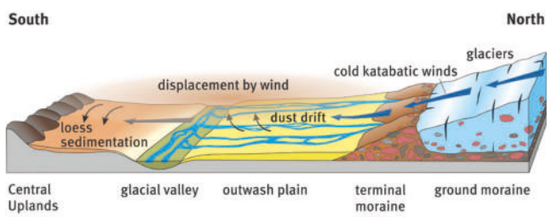
Loess – dusty gold

Why is loess so special? What are the reasons for loess soils to become so fertile and hence turn them into true natural treasures? How can we preserve loess soils and use them sustainably?

Loess is a predominantly calcareous, homogeneous, pale yellowish sediment that mainly consists of silt-size particles. Silt is finer than sand, but coarser than clay and hence similar to dust. The term loess most probably originates from the Alemannic (Swiss-German dialect) expression Lösch „loose“.

Child of the Ice age

Most of the loess formed during the last ice age between 115 000 to 13 000 years before present. Much of Germany was a cold, tree-less steppe environment, into which glaciers extended from north and south. Glaciers and frost broke down rocks and stones and ground them into mineral dust. The latter was lifted into the air and deposited miles away from the source areas, often on the leeward sides of hills.



Loess formation in Northern Germany

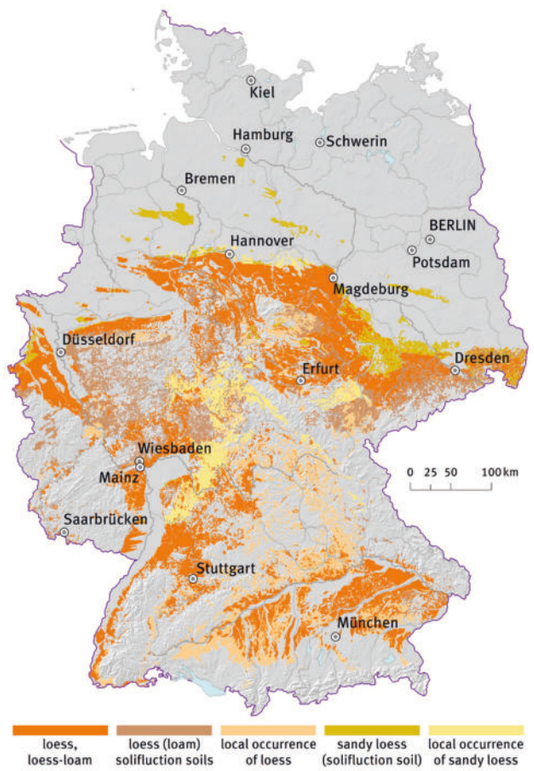
In Northern Germany this occured along the northern fringe of the Central Uplands, today‘s „Börden“ (fertile flatlands) with the Jülich-Zülpicher Börde in the West via the Magdeburger Börde up to the Leipziger Basin and the Saxonian Hills to the East.

In Southern Germany loess was deposited in areas north of the gravel plains of the Alpine rivers, in the Upper Rhine Valley and in the Central Uplands in the wide valleys and basins.

Diversity emerges

Remains of plants form humus that is deeply mixed into loess by soil organisms. When cold winters and summer dryness hamper Humus degradation, Chernozems form. In places where the finest particles of soils – clay particles – are translocated with seepage water into the subsoil, Luvisols form. If topsoil is bleached in this process, Haplic Retisols develop. If seepage water accumulates on top of clay-rich subsoil, Stagnosols and Planosols emerge.

The formation of all those soils always starts with a displacement of carbonate deeply into the still unweathered loess. In this process, centimeter-long, rigid concretions may form – the loess dolls.



Distribution of loess in Germany

Chernozem | Luvisol | Haplic Retisol

First choice

Easy cultivation and fertile soils have always attracted settlers. In former times such soils were already used for agricultural purposes. This is also known from archeological finds of tools and artifacts from the early Bronze Age, like the Nebra Sky Disc.

The high yield of soils was able to supply many people and thereby contributed to the development of cities.

Nebra Sky Disc and the excavation site: Mittelberg near Nebra, Germany

Today, many cities are located in or in the vicinity of loess regions (e.g. Cologne, Magdeburg, Stuttgart). Whenever new construction takes place, precious soil is lost.

Picture of loess landscape: Wetterau North of Frankfurt/Main, Germany

A knight in shining armor

Loess soil is free of stones and very porous. The space between silt particles is just big enough for the loess soil to store and provide water for plant usage and at the same time to be sufficiently conductive. Water may ascend within the soil like within filter paper when plants take up water, and when the rooting area is drier then the root-free zone below. With this, the plant‘s hydric stress during droughts is reduced and the yield increases.

Sugar beet harvesting near Hanover, Germany

The most water-demanding crops such as sugar beets are therefore preferably cultivated on loess soils. In addition, the rare forest stands on loess profit from a good water supply.