GEOPARK RIES

Europe's Giant Meteorite Crater

Hiking in the Meteorite Crater

GEOPARK RIES
Hiking Trails

Geopark Ries
Themed Hiking Trails

unesco
Global Geopark Ries

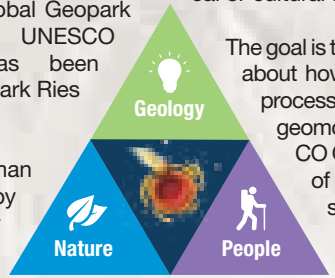
www.geopark-ries.de

Geoparks – A worldwide trend

The protection of unique biotopes has been common in Germany for some time now. Often geosites (places of geological interest) are also included. Yet geological features and their protection have been increasingly appreciated in their own right only since the late 1990s. The designation of geoparks has been gaining ground worldwide since 2001: UNESCO even initiated a "Global Geopark Network." Since 2015 the UNESCO Global Geopark label has been awarded, with which the Geopark Ries has also been honored.

There are presently 18 German National Geoparks certified by the GeoUnion Alfred Wegener Foundation, eight of which are also designated as UNESCO Global Geoparks.

Geoparks are regions with exceptional geology and contain places of geological interest (called geosites or geotopes) of particular scientific importance, rarity or beauty. They may also include archeological, ecological, historical or cultural sites.



The goal is to provide visitors with knowledge about how Earth formed, what geological processes shape it and how geology and geomorphology affect habitats. UNESCO Global Geoparks raise awareness of the uniqueness of the Earth and serve a declared UNESCO goal: **The preservation of creation.**

CONTENTS

GEOPARK RIES
Europe's Giant Meteorite Crater

unesco
Global Geopark Ries

NATIONAL GEOPARK RIES

QR code to open the Geopark Ries Web-App:
All GPX files of the Geopark Ries themed hiking trails can be downloaded. Easy-to-understand info about selected locations, option to read (Germ/Eng) or listen (Germ/Eng).

OVERVIEW MAP OF THE UNESCO GLOBAL GEOPARK RIES
with the Geopark Ries themed Hiking Trails, Adventure Geotopes and all Geopark Ries Info-Centers and Info-Points.

Geopark themed hiking trail
Geopark Info-Center / Info-Point
Geopark Adventure Geotope
Geopark Ries border
State border (Bavaria / Baden-Württemberg)

The UNESCO Global Geopark Ries has an area of about 1,750 km². As an association, it forms a network that reaches across states and counties. The larger part of the area is located in Bavaria, the smaller part belongs to Baden-Württemberg. A total of five districts with 53 communities are involved. The Geopark Ries encompasses the meteorite crater and the regions where ejected masses can still be found today.

Distinguished as a UNESCO Global Geopark in 2022, the Geopark Ries has held the seal of quality as a German National Geopark since 2006.

The Ries Crater is one of the best preserved and researched impact craters on Earth – and so a first-class geological feature. It has a magnetic effect – and not just on geologists. A large and consistently increasing number of geo-tourists, school groups, interested sightseers, hikers and cyclists from all over the world make their way to the Ries in search of traces of the “cosmic catastrophe.”

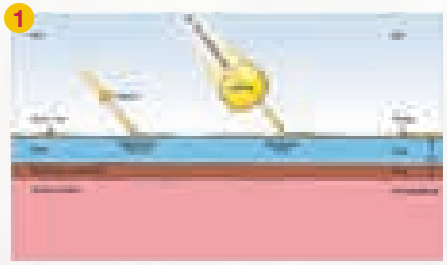
The asteroid impact that occurred approximately 15 million years ago had a fundamental and definitive influence on the landscape and qualities of the geological underground that is still discernible today. Through the UNESCO Global Geopark Ries, these geological and geomorphological processes and their far-reaching consequences become visible and vivid.

At many locations, visitors can comprehend the influences of the geological formations on the composition of soils and habitats, why dry-grassland biotopes formed on the edges of the crater, which factors prompted early settlers to inhabit the crater basin as early as the Stone Ages and why, even today, the Ries Crater is one of the breadbaskets of Bavaria.

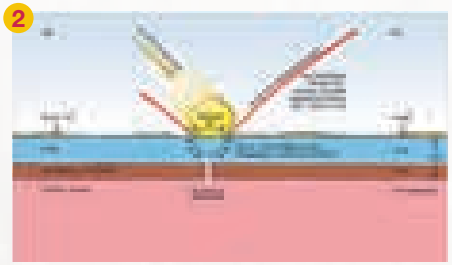
The UNESCO Global Geopark Ries focuses the attention of residents and visitors on environmental features as well as natural and cultural treasures and, in this way, encourages respectful interaction with the unique heritage. The Geopark’s most important tasks are to make accessible and to protect the unique geological heritage and to promote science and environmental education.

A COSMIC CATASTROPHE

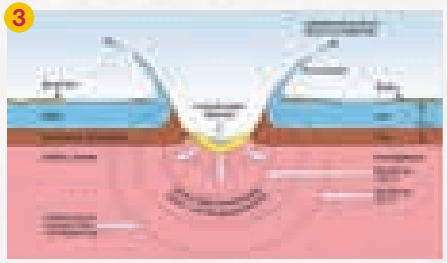
Almost 15 million years ago: An asteroid about 1 km in size hurtles towards Earth at a speed of over 70,000 km/h. When it crashes into the Alb highlands, it tears a 4.5-km deep hole in the Earth's surface – and today's Ries Crater begins to form.
Huge chunks of rock are thrown through the air, rock debris (Trümmermassen flies as far as 50 km. The impact results in a pressure of several million bar units and a temperature of more than 20,000 °C – the energy released equals the explosion of several hundred thousand Hiroshimasize bombs. Even diamonds and other high-pressure minerals are formed by the shockwave.



35 milliseconds before impact.

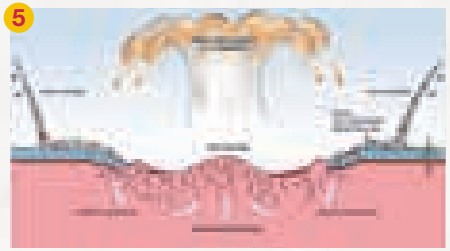


10 milliseconds after impact.



Beginning of crater formation after 60 milliseconds.

Formation of the deep "transient crater" after about 10 seconds.

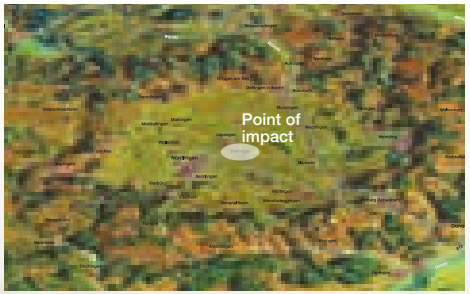


Collapse of the "transient crater" and deposition of ejected rock masses after 1 minute.

End of crater formation and deposition of Suevite after 10 minutes.

THE RIES CRATER

The Nördlinger Ries impact crater is Europe's best preserved crater. The flat, largely unwooded and densely populated crater basin, with its 25-kilometer diameter and up to 150-meter-high outer crater rim, is quite visible in the landscape.
The UNESCO Global Geopark Ries shows how the impact of the asteroid 15 million years ago radically reshaped the landscape and how this event still shapes the region today.



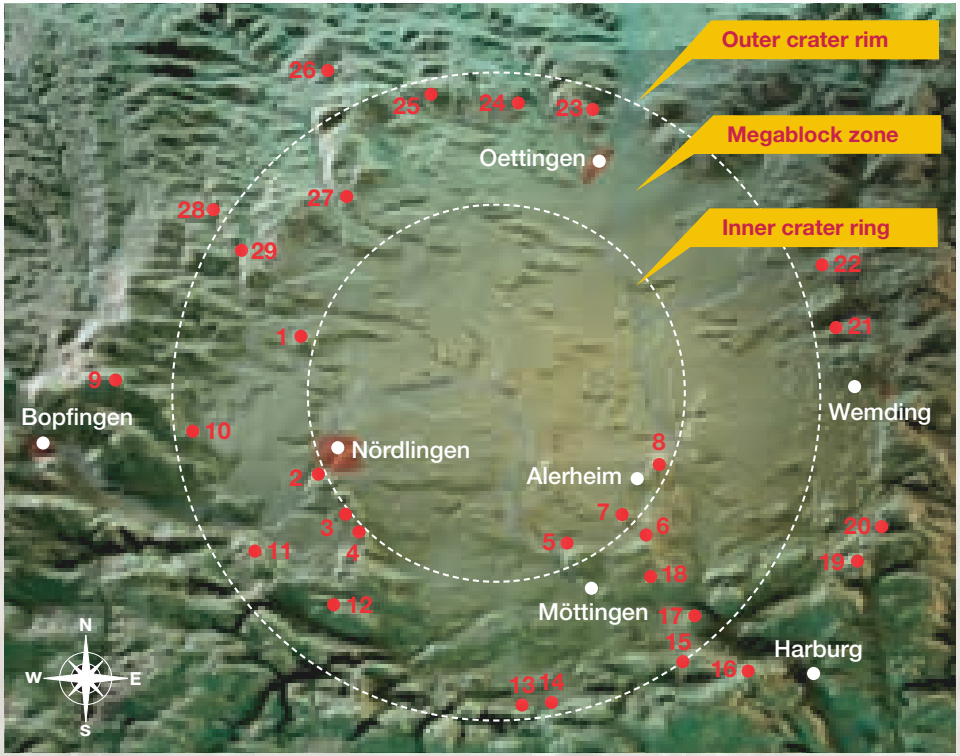
Easily identifiable in the Earth's surface, the crater shape makes the UNESCO Global Geopark Ries unique.

SPECIAL ROCKS

Suevite from the Otting quarry

The **impact of the celestial body** formed a glowing cloud of vaporized and molten rock as well as shards and melted fragments of crystalline basement. The glowing cloud ultimately collapsed and settled over the landscape destroyed by the impact. The resulting rock is named **Suevite** or **"Schwabenstein"** (translated as "Swabian stone" from the Latin *Suevia* = Swabia). The asteroid's impact also shattered (in geology: brecciated) rock in formations at various depths and hurled it out of the crater. In the process, chunks of the most varied sizes were swirled together and chaotically deposited. Due to the rock fragments' different colors, the ejecta masses appear colorful (in German = *bunt*), hence the name ***Bunte Trümmermassen*** (rock debris including blocks) and **Bunte Breccia.** The proportion of the various rock fragments, as well as their grain size, which ranges **from fine dust up to kilometer-sized blocks,** varies widely from place to place.

Bunte Breccia from the Harburg-Ronheim quarry.



Fantastic views over the Ries basin: The Geopark Ries has plenty of sites where visitors can let their gaze wander and thus grasp the fascinating structures of the meteorite crater: The elevations of the about 12-kilometer-wide inner crater ring, the outer crater rim and the megablocks are wonderfully suited as vantage points.

Inner crater ring

1 Wallerstein Cliff
2 Marienhöhe
3 Stoffelsberg
4 Adlersberg
5 Hahnenberg
6 Steinberg
7 Alerheimer Schlossberg
8 Wennenberg

Megablock zone & outer crater rim

9 Blasienberg
10 Goldberg
11 Riegelberg
12 Albuch
13 Kühstein
14 Buchberg
15 Glaubenberg
16 Bockberg
17 Rollenberg
18 Kratzberg
19 Mähhorn
20 Kalvarienberg
21 Hessenbühl
22 Kühberg Trendel
23 Roßfeld
24 Staudigberg Ehingen
25 Belzheimer Berg
26 Urlas bei Schopflohe
27 Hahnberg Maihingen
28 Kreuzberg
29 Kapellenberg Unterwilflingen

INNER CRATER RING

With a **diameter of about 25 km,** the Ries Crater is a "complex" impact crater with an inner ring. Here crystalline basement from over **600 meters deep was uplifted** by the forces of the asteroid impact **and raised into a ring** (see impact graphic on page 6). The ring "wall" of granites, gneisses and amphibolites has a **diameter of about 12 km** and represents the rim of the primary crater, which was temporarily **4 to 5 km deep** (impact graphic 4). This inner crater ring is still **clearly visible today** as a circle of distinctive elevations in the Ries plain: the Wallerstein Cliff, Marienhöhe, Meyer's Keller, Stoffelsberg, Adlersberg, Hahnenberg and Wennenberg near Alerheim are among them. The crystalline rock of the inner crater ring belongs to the 300- to 600-year-old Variscan basement (Moldanubicum), which still lies on the Earth's surface in the Bavarian and Bohemian Forest and in the Black Forest. Hence the Nördlinger Ries provides a **unique surface exposure between these two mountain massifs.**

MEGABLOCK ZONE

The megablock zone lies between the inner crater ring and the outer crater rim. It is part of the Ries Crater's ejecta blanket that is also **termed *Bunte Trümmermassen* or Bunte Breccia.** The *Trümmermassen* (debris) was hurled outwards from the center by the enormous forces of the asteroid impact. But megablocks also slid inwards to some extent. The non-local (allochthonous) blocks of the megablock zone originate predominantly from the younger **Jurassic and Triassic sedimentary rock,** which was closer to the surface before the impact, but also the **crystalline basement rock** (see page 6). The sizes of the blocks range from more than 1 km in the megablock zone and decrease with increasing distance from the crater center. As a rule, megablocks, especially Upper-Jurassic limestone, are **intensely shattered ("mortar texture")** and are then referred to as "monomict **limestone breccia."**

OUTER CRATER RIM

The outer crater rim bounds the depression formed by the Ries impact. It is particularly clearly formed in the southern region.
The highest elevation of the crater rim is the Ohrengipfel on the Härtsfeld plateau at 652 meters above sea level.

Yet the ejected rock debris and other impact rocks like Suevite overlaid the existing geology for many kilometers beyond the outer crater rim. Therefore, the area of the Geopark Ries is much larger than the actual meteorite crater.

ON SPACE MISSION IN THE RIES CRATER

The first time the astronauts stood on the ground of the Ries Crater basin was early August 1970. Although the lovely, densely populated Ries Crater does not really look like a lunar landscape, the astronauts are here to prepare for the Apollo-14 mission. In "field training" they are to practice identifying various types of rock in the terrain. Here in the Ries, as in the Moon's craters, they find typical rocks formed by the impact of an asteroid.

American astronauts carried out field training in the Ries for the Apollo missions.

The young men face a tough program: In three days they must visit 13 quarries. In the Siegling quarry (next to Adventure Geotope Lindle) they study the geologically reversed sequence of rock layers; in a quarry near Otting they become familiar with the typical impact rock Suevite; and in the Langenmühle quarry near Maihingen (Geotopes Klosterberg) they become acquainted with changes in mineralogy – for example, high-pressure minerals.

The Ries: a planetary teaching site

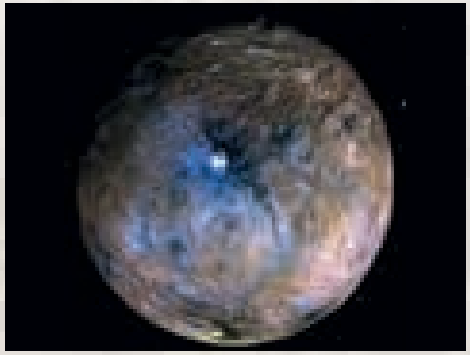
During the Late Heavy Bombardment (LHB, or lunar cataclysm) around 4 billion years ago, both the Earth and the Moon were particularly frequently hit by meteorites and asteroids. In contrast to the Earth, the Moon has no atmosphere as a protective shield, erosion is practically nonexistent. Therefore the Moon is dotted with well-preserved impact craters of all sizes. The Apollo-14 mission confirmed that the impact rocks and geological structure of the debris field of the Fra Mauro crater on the Moon are similar to what is found in the Ries Crater. Consequently, NASA continued its research in the Ries, and recently even Mars researchers have become intensely interested in the Ries. So the Ries is and remains a planetary teaching site.

GEOPARK RIES – AN IMPORTANT TRAINING AREA

To this day the Ries Crater is an important training area for international space missions. Part of NASA's Discovery Program, the Dawn spacecraft was launched on 27 September 2007. It orbited and explored the asteroid Vesta and the dwarf planet Ceres from 2011 to 2018. In 2011 the mission's scientific team familiarized themselves with the geological structure of an impact crater in the Geopark Ries.

The *Rosetta* mission's OSIRIS scientific camera team carried out exercises for rock identification in the field in the Geopark Ries. *Rosetta* is an ESA (European Space Agency) space probe launched on 2 March 2004. With its lander module *Philae,* the space probe has conducted detailed studies of the comet 67P/Churyumov-Gerasimenko.

Comet 67P/Churyumov-Gerasimenko was studied by the ESA Rosetta space probe.



The dwarf planet Ceres was orbited by the Dawn space probe.

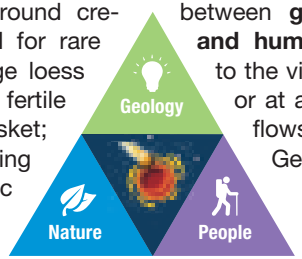
In **2017, 2018 and also in 2022, ESA astronauts** also carried out geological field studies in the Geopark Ries to prepare for stays in the International Space Station (ISS) as well as for future manned missions to the Moon and Mars. In 2022, for example, the German ESA astrona**ut and former ISS commander Dr. Alexander Gerst and NASA astronaut Stephanie Wilson were also at the UNESCO Global Geopark Ries for several days of geological training.**

LIFE IN THE CRATER LAKE – AND ON MARS?

The Ries Crater even serves as a comparative object for the ongoing Mars 2020 mission with the *Perseverance* rover. The goal of this mission is to detect life on Mars. The Jezero Crater was chosen as the landing site on Mars because, **just like the Ries Crater,** it is an impact crater that was **once filled with a lake,** and this circumstance represents the best prerequisite for the emergence of life. Both lakes had extremely high pH value. In the Ries lake, this circumstance favored the mass emergence of bacteria. In the search for traces of bacteria and their deposits on Mars, therefore, it is most worthwhile to look where there are rocks similar to those in the Ries. A team of researchers from Göttingen, the USA and Scotland has developed a new method for measuring Martian rock. The method was tested on the millions-of-years-old deposits from the Ries Lake. In a few years, follow-up missions are expected to bring rock samples from Mars to the Earth for the first time.

UNESCO GLOBAL GEOPARK RIES – EXPERIENCE THE CONNECTIONS

At some places in the Ries, everything simply comes together: The impact-formed geological underground creates **conditions essential** for rare plants and animals; ice-age loess sediments form today's fertile soils of Bavaria's breadbasket; a hill of the inner crater ring was contested as a strategic point in the 30 Years' War.



At these points – and many others – the larger connections in the interplay between **geology, landscape, nature and human influences** are revealed to the visitor. Whether on hiking trails or at an Info-Point, here everything flows together that makes the Geopark Ries unique.

SPECIAL GEOLOGICAL FEATURES

You only see what you know – what hills, cliffs and quarries can tell us

At some places on the Earth's surface, geological features come to light that especially eloquently relate to us the geological history of the Earth, reveal **rare geological phenomena** or simply are of **particular beauty.** Such places – whether they are manmade outcrops like quarries or natural landscape forms like caves, rock walls or steep cliffs – are called geosites or **geotopes.** Geotopes in the Geopark Ries are **geological points of interest** that are typical of a meteorite crater and make its formation history visible. That is why they are also called **"Windows into the Earth."** The Geopark Ries has about 150 of these valuable natural creations, five of which are among the **100 best geotopes in Bavaria.** A major special feature: The entire Ries Crater is designated as a National Geotope!

SPECIAL LANDSCAPE FEATURES

Unique formation, unique natural treasures: dry grasslands, wetlands, forests and more

The stages of the development history – from the impact event through deposits in the Ries Lake, erosion or the accumulation of loess and wind-blown sand – form the **basis for the appearance of the Ries landscape today.**

In the almost forest-free Ries basin, rivers and streams with accompanying wetlands alternate with the broad, fertile agricultural areas as well as sparse dry grasslands in the peripheral regions. The vegetation is a reflection of the soil; in turn, the soil is a reflection of the geology. The Ries is a diverse cultural landscape. The clearly visible crater shape is the result of the meteorite impact. The clearly visible surface form (geomorphology), the crater itself, is the result of the meteorite impact. The dry grassland and juniper heath areas are traditionally grazed by sheep in line with migratory sheepherding. Numerous rare animal and plant species are native to the region. Extensive meadows and wetlands provide sustenance for the lapwing, Eurasian curlew, common snipe and white stork.

Situated where the Franconian abuts the Swabian Alb, the juniper heath landscapes of the crater rim perform a **bridging function.** Western Mediterranean, eastern continental and Alpine species occur side by side in the region. The area is therefore considered a **"hot spot" of biological diversity.**

BESIEDLUNGSGESCHICHTE

Something from all of them remains: Stone-Age people, Celts, Romans, princes, farmers

Considered a **treasure trove of prehistory and early history**, the Ries boasts an impressive settlement history: from the Paleolithic through the Celtic, Roman and Alemannic periods up through the state development of the Middle Ages and the early modern times. Thus a multifaceted cultural diversity arose – the Ries has the **highest concentration of monasteries, churches and other historic structures** in all of Bavaria. The UNESCO Global Geopark Ries is home to a large number of pre- and protohistoric archeological monuments. The Stone-Age caves, for example, attest to a vibrant past of the Ries basin – as do the Celtic princely settlement, ramparts and burnt-offering sites of the Metal Ages. In addition, numerous relics of Roman and Alemannic sites are found in the Geopark Ries.

“Themed” hiking in the UNESCO Global Geopark Ries

The Geopark Ries is a wonderful place to hike. **An extensive system of trails reveals the charm of this extraordinary landscape:** lush vegetation in the crater basin and sparse heath landscape on the crater edge. Long-distance hiking trails show the unique Ries landscape, Geopark trails like the Shepherd’s Way link geology, settlement history and natural-history features, providing information on panels along the routes.

REGARD FOR NATURE

The hiking trails lead through rich cultural landscapes and in part also through protected areas for **plants and animals. So, please stay on the marked paths, keep dogs on leashes and do not pick or disturb plants in the protected areas and biotopes.**

RECOMMENDATIONS FOR HIKING

On our hiking trails, there are long stretches of **near-natural paths; a convenient stop for refreshment or facilities may not always be available in your vicinity**. When preparing for a tour, therefore, you should consider sufficient liquids, hiking shoes and socks, tissues, sun and rain protection, a trash bag, possibly insect repellant and – in case of emergency – a cell phone.

SIGNS ON OUR THEMED HIKING TRAILS

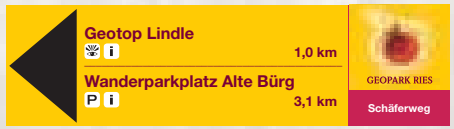
Our themed hiking trails inform hikers about geology, landscape, nature and settlement history.

Trail signs

Signs like this regularly mark the Geopark hiking trails.

Info signs

In addition, there are often signs pointing out side trips or highlighting vantage points.



Ground markings

Markings on forest paths, streets and trees supplement the trail signs.

Panorama panels

Along the way, panorama panels explain the respective view.

Info-panels

Informative as well as scientifically prepared panels along the trails provide information about the landscape, nature, history and culture. The **color code** on the panel indicates the topic for which information is provided. You will find a brief summary of the info-panel contents on the next pages.

Color codes of our info-panels

- Geological feature
- Landscape feature
- Settlement history, archeological and cultural history site, ground monument
- Museum
- Church/monastery
- Vantage point

Ries Panorama Trail (Ries-Panoramaweg

The Hiking Trail around the Meteorite Crater

To hike around the entire Ries crater, in the middle of a **unique natural landscape**—that is possible on the Ries Panorama Trail. The about 128-kilometer long-distance trail is divided into seven daily stages, each at most 21 kilometers. This allows enough time to explore, observe, enjoy and stop for a bite to eat. Each of the seven stages begins with a "start" panel. Along the route, info-panels explain what is worth **seeing and knowing about the topics of the UNESCO Global Geopark Ries**. Panoramic panels describe the respective views

START AND FINISH

The **first stage** of the Ries Panorama Trail starts at Harburg Castle's "Unterer Burgparkplatz" parking and proceeds over idyllic paths to the Old Town of Wemding. The starting point for the **second stage** is in Wemding's moat. This day's tour leads along the eastern crater rim and ends in the princely residence town of Oettingen. Alongside cultural landscapes and elevated vantage points, the **third stage** ends in the former pilgrimage destination of Raustetten. The **fourth stage** passes chapels and picturesque natural highlights on the way to Kirchheim am Ries, in the state of Baden-Württemberg. Along the eastern rim of the crater, through nature reserves, the **fifth stage** leads to the leisure destination of Utzmemmingen. On the **sixth stage** you hike in the footsteps of history to Mönchsdeggingen. The **seventh stage** leads along the southern crater rim, through beautiful forests and ends at the starting point in Harburg.

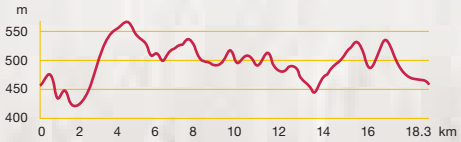
GEOPARK RIES
Ries-Panoramaweg

STAGE 1

From historical castles to agricultural history

Harburg (Unterer Burgparkplatz) to Wemding (Marktplatz)

Altitude difference ca. 860 m; **Walking time** 5 hrs; **Route length** ca. 18.3 km

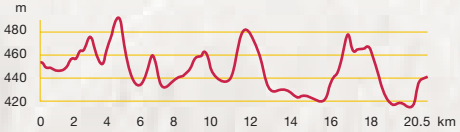


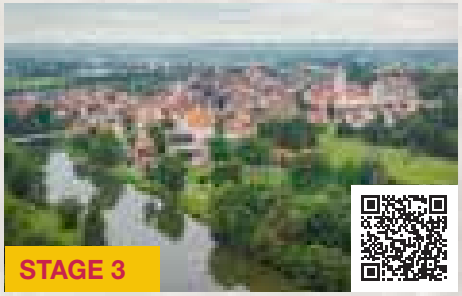
STAGE 2

From old-town Wemding to noble-residence town Oettingen in Bayern

Wemding (Stadtgraben = town moat) to Oettingen (Parkplatz Friedhof = cemetery parking)

Altitude difference ca. 560 m; **Walking time** 5,15 hrs; **Route length** ca. 20.5 km



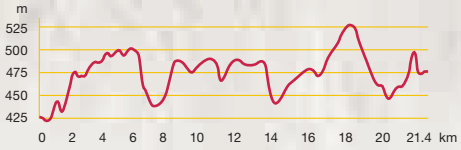


STAGE 3

From the noble-residence town Oettingen to the former pilgrimage site Raustetten

Oettingen (Parkplatz Friedhof = cemetery parking) to Raustetten (Dorfplatz = village square)

Altitude difference: ca. 670 m; **Walking time:** 5,30 hrs; **Route length:** ca. 21.4 km

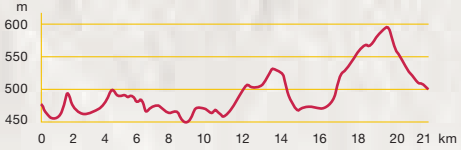


STAGE 4

Over forest and meadow trails past a chapel and idyllic natural highlights

Raustetten (Dorfplatz=village square) to Kirchheim am Ries (Parkplatz Kloster = monastery parking)

Altitude difference ca. 655 m; **Walking time** 5,30 hrs; **Route length** ca. 21 km

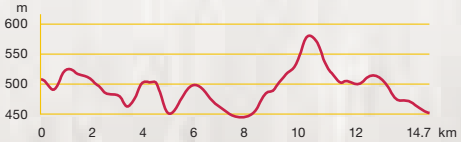


STAGE 5

Bats and nature reserves

Kirchheim am Ries (monastery parking) to Utzmemmingen (street named Platz von Esvres)

Altitude difference ca. 610 m; **Walking time** 3,75 hrs; **Route length** ca. 14.7 km



STAGE 6

From liesure destination Utzmemmingen on the trail of history

Utzmemmingen (street Platz von Esvres) to Mönchsdeggingen (monastery)

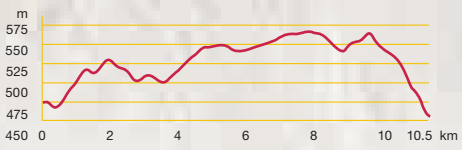
Altitude difference ca. 740 m; **Walking time** 5,30 hrs; **Route length** ca. 21.5 km

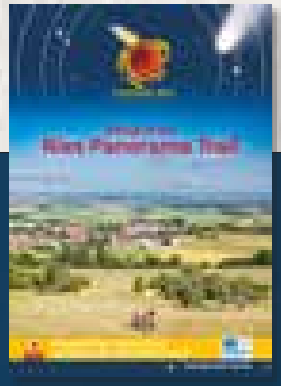
STAGE 7

From monastery to castle through lovely forests and an encounter with the planetary path

Mönchsdeggingen (parking near monastery) to Harburg (Unterer Burgparkplatz)

Altitude difference ca. 355 m; **Walking time** 2,45 hrs; **Route length** 10.5 km





INFO TIP

Additional information is provided in our booklet “Hiking on the Ries Panorama Trail.”

Schäferweg (Shepherd's Way)

Over the southwestern crater landscape with the wandering shepherds

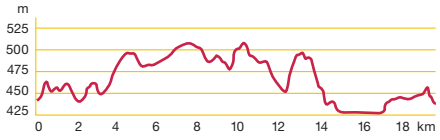
The signposted circular hiking trail links **geological and archeological features on a foray through nature**. Along traditional paths of wandering shepherds, info-panels explain geology, settlement history and extensive heath landscapes, typical natural areas of the Ries perimeter.

A phenomenal variety of topics can be explored in a length of 19 kilometers: On the Shepherd's Way, Europe's best preserved meteorite crater shows what distinguishes the UNESCO Global Geopark Ries.

Altitude difference: ca. 240 m

Walking time: 5.5 – 6 hrs

Route length: ca. 19 km



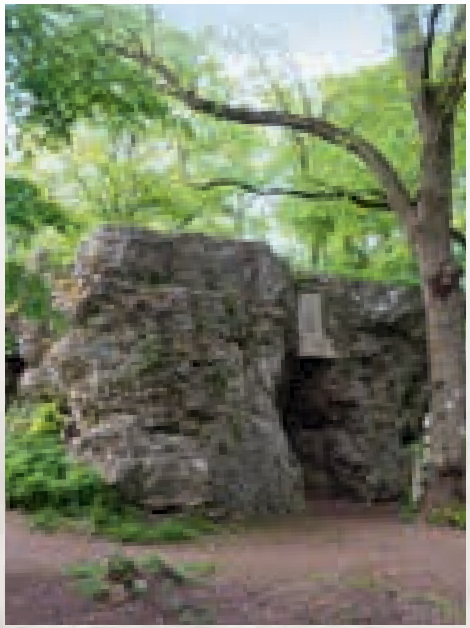
START AND FINISH

Start at the parking lot of the **Freibad Marienhöhe** (outdoor swimming pool) – accessible by car via the B466 or by bus on Buslinie 508, Kurs 2, Bushaltestelle Dr. Hausmann-Str./Herkheimer Weg (bus line 508, course 2, stop Dr. Hausmann St./ Herkheimer Way). Following the red-yellow "Schäferweg" signs, the path leads over the **Hexenfelsen** 1 and the **Meyer's Keller outcrop** 2 to the **Adlersberg hill** 3. At the Reimlingen woods, turn right and walk past the Lachberg garden plots. After the B466 underpass, the path goes left to **Alte Bürg** 4 and around the building complex. From here the path leads past the **Altenbürg quarry** 5 and over the **Riegelberg hill** 6 **with the Ofnethöhlen** (Ofnet caves). At Utzmemmingen cross the street and follow along the Eger (a tributary stream) and through Kleinerdlingen back to the swimming-pool parking lot.

Alternatively, the tour can also be started at the "Alte Bürg" parking lot. To do this, take the B466 out of Nördlingen and turn right at the next intersection on the height after Holheim.

HEXENFELSEN (Witches' Rock) 1 Fascinating carbonate rock of the Ries Lake

After the asteroid impact a closed-drainage crater basin formed. **Torrential rains resulted in the formation of a crater lake, the Ries Lake.** Presumably the Hexenfelsen at times protruded from the lake as an inselberg, an isolated rock hill. Today, millions of years later, the imposing, isolated cliff marks part of the wreath-like inner ring. The base of the Hexenfelsen consists of 300- to 600-million-years-old crystalline rock, which was moved from the depths to the surface during the impact. Algae and bacteria in the Ries Lake formed sediments that were deposited on it as a layer of limestone. **For a time, the Galgen- or Henkelberg (Gallows' Hill) was an execution site of the imperial city of Nördlingen.**



The Hexenfelsen's base of basement rock was raised from the depths by the impact.

EXCURSION TIP

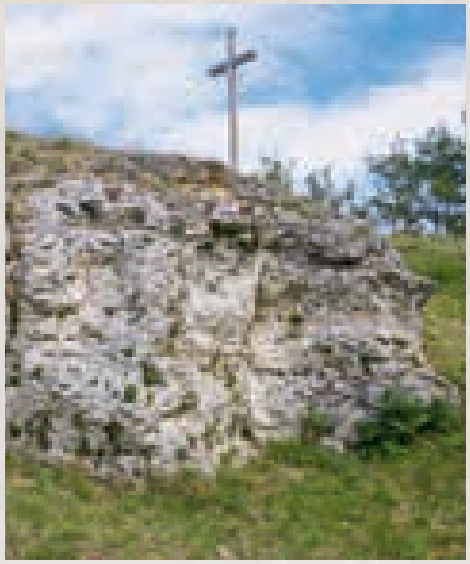
You can walk on the impressive city wall completely around the picturesque, excellently preserved Old Town of Nördlingen. But Nördlingen also offers a visit in a unique museum, the **Ries Crater Museum**, that fascinates the visitor with its central theme – the formation of the Nördlinger Ries and other impact craters. The highlight is a genuine, **original Moon rock** that was brought to Earth by Apollo-16 astronauts.
(www.rieskratermuseum.de)

MEYER'S KELLER 2 Shattered and raised basement rock

Upon impact the asteroid penetrated almost a kilometer deep into the crystalline basement. **The enormous shockwave smashed the affected rock**, lifted it up several hundred meters and formed the crater's inner ring. The outcrop visible here shows the so-called "polymict crystalline breccia" – a chaotic mixed composite of different shattered rocks. The outcrop on the eastern slope of the Galgenberg (Gallows' Hill) – the former execution site of the imperial city of Nördlingen – also shows limestone deposits from the most recent history of the crater lake.

Rocks of the crystalline basement strongly changed ("shocked") by the impact.

ADLERSBERG 3 Rock-forming fossils of the Ries Lake



The Adlersberg is part of the inner crater ring. Its base is composed of **granites, gneisses and amphibolites**, which were shattered during impact and lifted up from the depth several hundred meters. After the impact, the Ries Lake formed in the crater. Algae and bacteria left calcareous deposits on the heights of the inner ring. This is called **Ries-Lake limestone**. Especially **large quantities of fossils** from this period are found In the Adlersberg's limestone layer. Frequent finds of the tiny water snail Hydrobia trochulus and the equally small ostracod *Strandesia risgoviensis* indicate slightly elevated salinity of the lake water.

Ries-Lake carbonate with fossilized remains of a green-algae reef.

DIE ALTE BÜRG 4 Hilltop castle site, pilgrimage destination, sylvan guesthouse

The origins of the "Alte Bürg" ("Old Fortress") are lost in history. At its **first documented mention, in 1274**, it was already an **abandoned castle site**. Today, however, only a late-Romanesque chapel remains from the castle-fortress. Until into the 18th century, the "Alte Bürg" was a **well-visited pilgrimage site** – especially on 13 August, the feast of Saint Hippolytus. Still a popular excursion destination, the sylvan guesthouse at the foot of the former fortress site was established before 1925. Today you can also get the keys to visit the chapel and for the gate to the Altenbürg quarry.

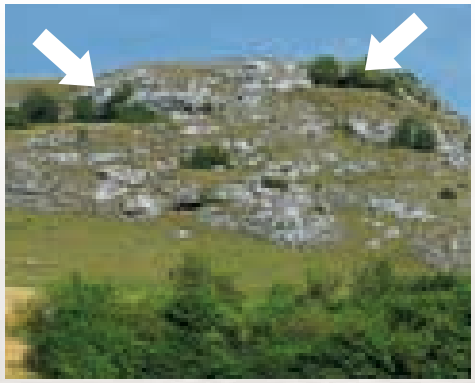
This is how Friedrich Weinberger saw the building ensemble "Altebürg" in 1864.

ALTENBÜRG 5 Suevite quarry – historical monument of Ries geology

The Suevite excavated **here was originally thought to be tuff**, that is, solidified volcanic ash. A mistake, as it turned out: Today we know that "**Schwabenstein**" (from *Suevia,* Latin for Swabia) was formed when the glowing cloud above the crater collapsed, settled onto the Earth's surface and cooled and re-solidified. This rock, which contains the high-pressure minerals coesite and stishovite, among others, is now considered the most important evidence for an **impact crater** worldwide. The dark glass "bombs" – the so-called "Flädle" – embedded in the gray Suevite are distinctive. The **construction material for Nördlingen's St. George's Church** with its 90-meter-high tower "Daniel" probably came from this quarry.

Altenbürg quarry with Suevite

RIEGELBERG 6 A megablock that slid from the crater rim



From a geological point of view, the Riegelberg hill has only been at its current location and position for a short time. During the impact event about 15 million years ago, this gigantic block of Upper-Jurassic limestone (White Jurassic or Malm) slid from the crater rim into the forming Ries Crater. **The Riegelberg is part of the so-called megablock zone** – where the impact shattered, tilted and shifted chunks of rock, some of them several kilometers in size, towards the center of the crater.

The two Ofnet caves are located on the slope of the Riegelberg.

OFNET CAVES – AN ARCHEOLOGICAL SITE

Located on the southern slope of the Riegelberg, the Ofnet caves are **important archeological sites whose finds date back to the Stone Ages**. The caves are famous because of a discovery in 1907 of **two "nests" of skulls about 8,000 years old** – the severed heads of 33 adults, children and youths.

The Nördlingen Stadtmuseum (City Museum) displays a replica of the "nests" of skulls found in the Great Ofnet cave.

"VILLA RUSTICA" Roman agricultural estate

The remains of a Roman agricultural estate with main building, bath house and farm building (AD 1st century) are **located at the foot of the Riegelberg**. The ***villa rustica* may have sheltered up to 50 people**. The farm was abandoned in the 3rd century after the invasion of the Alemanni.

Roman agricultural estate villa rustica at the foot of the Riegelberg

Sagenweg (Saga Way)

Experience myths, stories and geology on the eastern rim of the crater

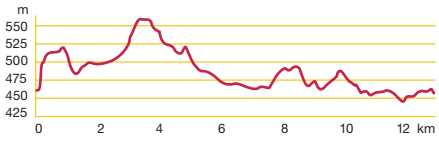
The circular hiking trail impressively links **historic and geological features as well as mythical legends** related to Wemding. It is aimed equally at nature lovers, hikers, geologists and geotourists as well as families with children.

Along the path on the Ries rim, the carefully chosen vantage points repeatedly offer **impressive overviews of the Ries Crater**, which was created by an asteroid 15 million years ago and today is the UNESCO Global Geopark Ries.

Altitude difference: ca. 200 m

Walking time: 4 hrs.

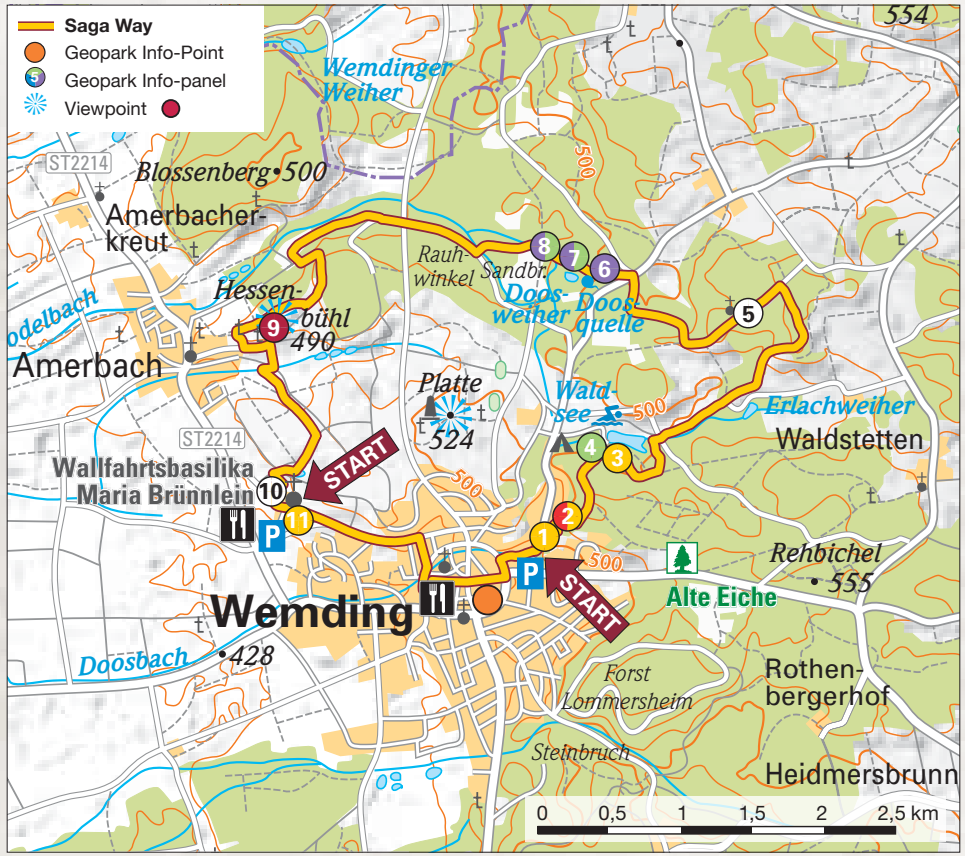
Route length: ca. 14 km



START AND FINISH

The starting point is the parking lot at the **Johannisweiher** (pond) ① (alternatively at the **pilgrimage basilica "Maria Brünnlein"** ⑩). Eleven informative as well as scientifically developed themed panels relate legends, geology, town history and stories along the about 14-kilometer-long-trail. Especially thrilling for **children and families are the legends about the Huaterle** ⑥**,** a little man with wide-brimmed hat, who drifts around the Doosweiher (pond) at nightfall, or the **three white Nonnen** (nuns) ⑧, who haunt the **Waldkapelle** (forest chapel) ⑤ or Doosweiher at night.

The **stories of the Wemding citizens** are recorded here for the future, made accessible to the population and integrated into the exciting Ries geology, which can be accessed by anyone with a closer interest via the Adventure Geotopes of the National Geopark Ries.



LEGENDARY GEOLOGY 1 11 Witnesses to the Ries catastrophe around Wemding

The Saga Way leads through a **wide-ranging mosaic of different types of rock**. The trail runs partly in the crater itself and over the outer crater rim. Here you encounter **sedimentary limestone from the period of the Ries Lake, which was formed later in crater**. Towards the east, the trail leads on the foothills of the Monheim Alb, a sub-region of the southern Franconian Alb. Here, in addition to undisturbed limestone of the Upper Jurassic (White Jurassic or Malm), there are numerous displaced blocks, which were hurled out of the crater or transported outwards by roll-and-glide movements during the catastrophe 14.5 million years ago. The **different types of rock** span a geological time interval of over 600 million years. They are joined by the impact-formed ***Bunte Trümmermassen*** (rock debris) and **Suevite** on the Alb.

Historic Market Square

FROM "UUEMODINGA" TO WEMDING 2 A stroll through history

The town of Wemding looks back on a long and eventful history. According to tradition, an Alemanni clan elder named Wembod settled here around AD 230. The settlement is mentioned for the first time in AD 793 as "uuemodinga". Numerous feudal lords appear in the course of history. From the middle of the 16th century, the town is graced with a new town hall, splendid town homes and a Capuchin monastery as spiritual center. The late-Baroque pilgrimage church "Maria Brünnlein zum Trost" ("Mary Fountain of Solace") is consecrated in 1782. After the Second World War, Wemding's economy developed from a basis of agricultural and trades to one with a focus on Mittelständ industries and tourism.

View from the eastern Ries rim over Wemding into the Ries Crater.

EXCURSION TIP

Geopark Ries Info-Centers Nördlingen, Oettingen and Treuchtlingen and **Info-Point** Wemding are knowledge centers and so the perfect places to find out more about the Ries Crater. The events and time periods of the cosmic catastrophe become tangible and understandable through the animation of the Ries impact and the interactive "Geological History of the Earth" and "Geological History of Europe."

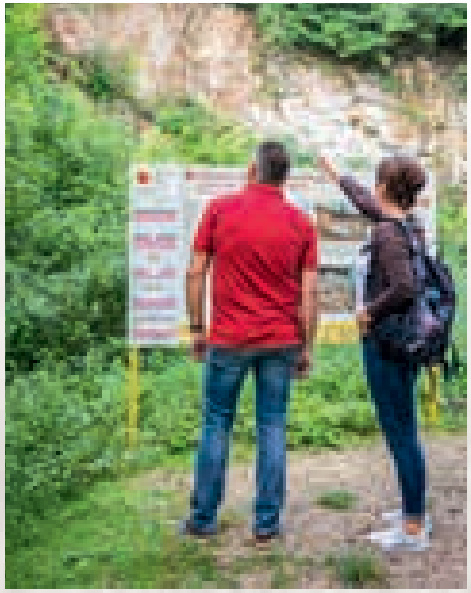
WEMDINGER WALDSEE 3 From Lohweiher (pond) to Waldsee (lake in the forest)

At all times, the most important prerequisite for settling in an area is a **reliable water supply**. This was also the case in Wemding. Until the 16th century, wells and drinking troughs supplied people and animals with the water they needed. Then the first of two water pipes began to distribute water in the town over wooden gutters. With a growing population, **new sources constantly had to be tapped**. In dammed ponds such as the **Erlachweiher, Lohweiher, Mühlweiher and Johannisweiher**, the townspeople tried to keep reserves to have enough water for firefighting, to operate the mills and in winter for ice for the brewery cellars. After the importance of the mills declined, the Lohweiher ("Weiher im Wald"="Pond in the Forest") **became a lake for swimming**.

Swimming lake Waldsee with campground

SIGNS OF DISRUPTION 4 Limestone quarry at the Waldsee

The enormous forces during the asteroid impact in the Ries **hurled huge blocks of rock through the air or displaced them through rolling and gliding movements**. The area of the Wemding Saga Way on the eastern Ries rim, therefore, displays a **completely chaotic deposit of various rocks** that span the last 600 million years of the Earth's geology. An impressive example of this is the **limestone block at Waldsee**. The *Scholle* (block) was pushed – completely intact – out of the crater and moved by gliding to its current location, hence the reference to "slide block." Due to its shattered condition, rock like this was used for decades for road construction or burned in lime kilns.



Upper-Jurassic quarry at the Waldsee with clearly formed vertical plate cleavage.

WALDKAPELLE (forest chapel) 5 Stations of Wemding's history and geology

In a forest stand ca. two kilometers north of Wemding, the Saga Way goes by an **elaborately designed Baroque chapel** that invites one to rest and reflect. The place has been dedicated to inner contemplation for over 500 years; a chapel honoring St. Wolfgang was built here as early as 1499-1500. Today's chapel **from the 18th century is dedicated to Our Lady**, whose image with the baby Jesus (probably a copy based on an Italian model) can be seen in the round niche. The chapel belongs to the town of Wemding and has been renovated and maintained by volunteers.

On the old road to Wolferstadt, this chapel gives hikers an opportunity for rest and inner contemplation.

THE HUATERLE 6 Legendary figure with a floppy hat

If you are at the Doosquelle (spring) in the evening, don't be surprised if there is groaning and cracking in the bushes. Perhaps **Wemding's best-known legendary figure** is on the move nearby: **the Huarterle**. A small, inconspicuous figure, he roams around wearing robes that are far too wide and large, well-worn shoes. The little guy is never seen without **his trademark, the wide-brimmed, floppy hat** that probably earned him the name Huaterle. He suddenly appears among cart drivers, mushroom hunters and woodcutters. It is always eerie when the Huaterle appears, but the Huaterle has never done anything to anyone.

Nobody has ever seen the legendary figure, but he comes alive again in a new disguise.

SUEVIT 7 The terrestrial "Moon rock"

The Ries impact event released energy that, according to calculations, was equivalent to several hundred thousand Hiroshima bombs. **A tremendous amount of rock was moved** during the cosmic catastrophe. Much of the rock vaporized and tore particles upwards into the higher stratosphere. After about 10 minutes, **a dense, hot cloud of rock fragments settled like a thick blanket over the Ries region – Suevite**. Extremely high pressures and temperatures led to the formation of high-pressure minerals like coesite and stishovite. Tiny diamonds and other mineralogical peculiarities have also been detected in Suevite.

The former Suevite quarry at Doosweiher shows the rock in a slightly weathered state. Gray, protruding, bulbous structures are small "Flädle" (G – re-solidified molten rock).

THREE WHITE NUNS (8) Hymn of praise at the Doosweiher

According to legend, **three nuns dressed in white** appear to nocturnal hikers at midnight In the vicinity of the former monastery, at the Doosweiher (pond) and near the Waldkapelle (chapel). On the Doosweiher they sail in a small boat over the water shining in the moonlight. In the middle of the pond they rise up and, with outstretched arms, sing the **praises of God** together. The little boat moves closer and closer to the observer. But suddenly the three figures disappear.
Who experiences this miraculous event? Only the virtuous!

In a small boat in the middle of the Doosweiher pond, three nuns dressed in white sing the praise of God at midnight.

PILGRIMAGE BASILICA (10) "Maria Brünnlein zum Trost" (Mary Fountain of Solace)

Chaplain Reinhard Köhler arrived at the "Shillerbrünnlein" (small fountain or spring) on his way back from Amerbach. There, according to the story, he came across something impenetrable, like a wall that prevented him from moving forward. In his distress he vowed **to build a chapel here and display in it the statue of a Mother of God**, which a pilgrim had previously brought from Rome. On 25 June 1735, while decorating the altar, a believer observed that **the eyes of the statue shifted**. At the end of June 1746 **another eye movement occurred**. As a result of these events, the **flow of pilgrims increased more and more**. In 1748 the cornerstone for the present-day church was laid. The church was consecrated on 21 April 1782.

Exterior view of Maria Brünnlein.

7-Hügel-Weg (7-Hills Way)

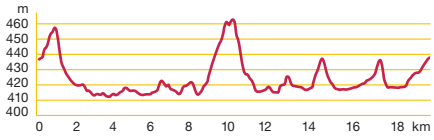
From hill to hill along the inner crater ring

The signposted circular hiking trail links impressive **geological, archeological and cultural-history features**. This route, which includes prominent elevations of the southeastern Ries, repeatedly offers panoramic views over the entire meteorite crater. Info-panels explain **geology, settlement history and former use of the landscape** along the approximately 20-kilometer-long path.

Altitude difference: ca. 180 m

Walking time: 5 – 6 hrs.

Route length: ca. 18 km

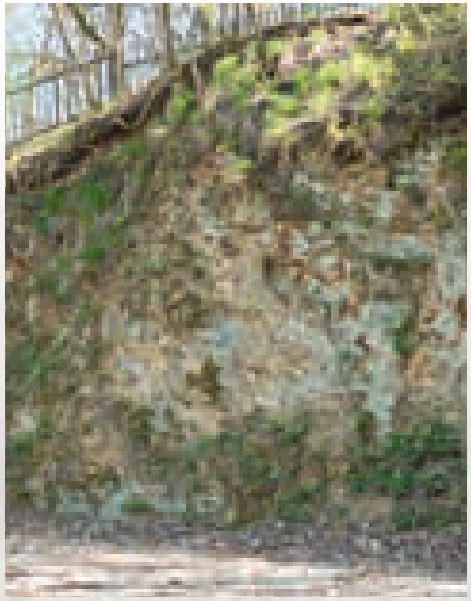


START AND FINISH

From the parking lot on **state road 2221 near Alerheim** – accessible from the B25 from the south or from Fessenheim from the north – follow the red-yellow signs up to the **Wennenberg hill** 1. From there the path leads along the river Wörnitz to **Wörnitzostheim** 2 and **Schrattenhofen** 3. Over a small bridge over the Wörnitz, it goes to Heroldingen, past a tithe barn and church and then up to the **Kratzberg** 4, from which you have a wonderful panoramic view over the Ries. Passing the **Hexenküche cave** 5, through Lierheim and Appetshofen, you reach the **Hahnenberg** 6. The path approaches the **Alerheim castle** 7, before it then goes through the village Alerheim back to the parking lot.

WENNENBERG 1 Geological feature with an outlook

The Wennenberg hill (469 m) juts out of the Ries plain at the **edge of the Wörnitz valley**. It is a part of the inner crater ring. During the Ries impact 15 million years ago, the **basement rock was pushed up** here. Therefore the hill consists mostly of crystalline basement. An outcrop on the plateau shows that, on the northern slope, it is interspersed with very dense rock, the so-called **Wennenbergite**. Graves from the Urnfield period (ca. 1200-750 BC) on the western slope furnish evidence of the early settlement of the Wennenberg. At the foot of the hill, the Roman road leads north to the Limes. After 1836, the Alerheim Scheible brewery had **two massive beer cellars cut into the rocky hill**, which was formerly a popular excursion destination.



Outcrop on the Wennenberg.

SHOPPING TIP

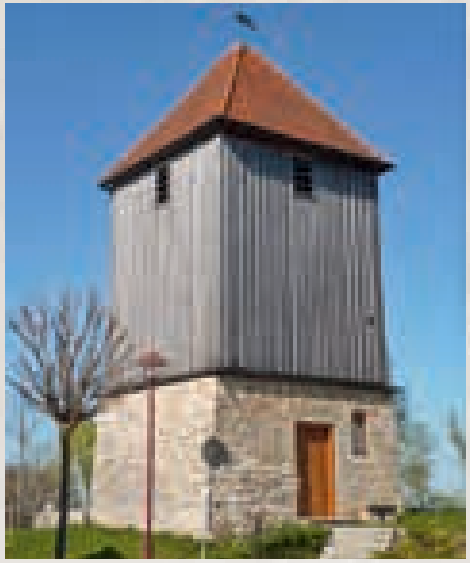
The **Dorfladen Alerheim** (village shop) as well as the Geopark Ries Culinary Partners **Brennerei Donare** (distillery), **Krater Spirits-Gin&Likör** and **Hofladen Sonnenhof** (farm shop) are located on the 7-Hills Way. You are also welcome to visit the **ten other cooperative village and town shops in the District of Donau-Ries** and the additional **Geopark Ries Culinary Partners**. All village and town shops as well as Geopark Ries Culinary Partners can be found at www.donauries.bayern/einkaufsfuehrer or under www.geopark-ries.de

WÖRNITZOSTHEIM 2

Near the village, traces from Neolithic settlement including the oldest Linear Pottery culture (ca. 5400 BC) were discovered – **traces of the first farmers in the Ries**. The village is mentioned in documents for the first time in 1254. Since prehistoric times and up to the 18th century a fortified ford in this area of the Wörnitz valley was the most favorable river crossing. The **Lutheran parish church of Sts. Maria and Anna** is located in the middle of the village. The walled cemetery as well as the massive tower base, from around AD 1200, still display the character of a former fortified church.

About 100 years ago, from a meadow outside Wörnitzostheim. The old wooden bridge can be seen in the background.

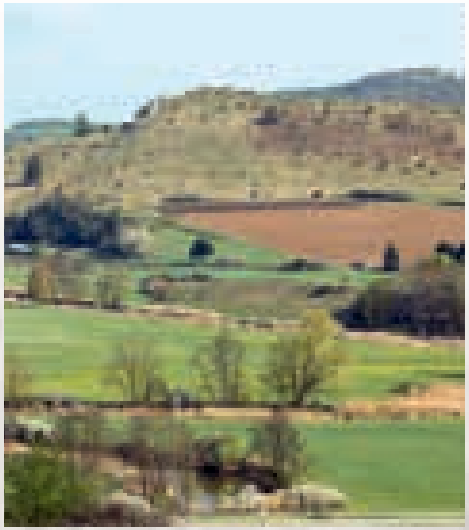
SCHRATTENHOFEN 3



A **hand axe about 40,000 years old** was found near Schrattenhofen. It documents the early presence of humans in the area. Previously a **small castle** stood at this location, but now only two building and remains of the wall are preserved. Into the 19th century a special type of **glazed ceramic (faience ware)** was produced here. On the nearby Kratzberg hill, Prince Albrecht Ernst II (1669-1731) had a zoo constructed which included a building for entertaining, a hermitage and falconry. When a strong downpour destroyed large parts of the garden, the prince had the hospitality house demolished, the hill leveled and a new palace built from 1700. Only **remains of the foundation** of the complex still exist.

Bell tower.

KRATZBERG – Wörnitz and Eger 4

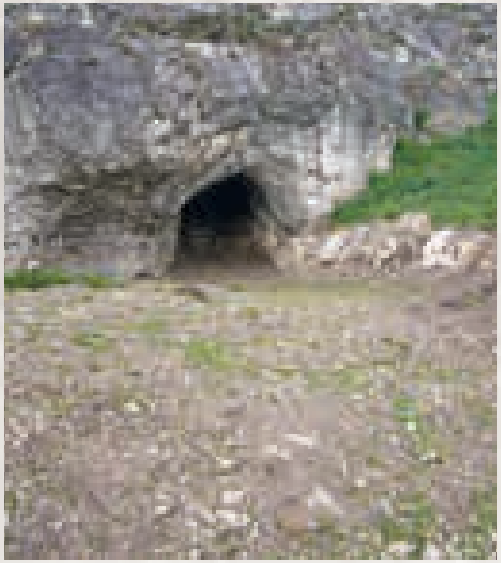


From the vantage point on the Kratzberg hill, the view opens onto the "**gateway to the Ries.**" Here, the river Wörnitz leaves the Ries plain after joining the river Eger. The charming valley was an important north-south connection throughout the ages, as documented by prehistoric **traders' storage as well as traces of old roads**. Located at the entrance to the valley, the **Rollenberg** hill and its juniper heaths provide valuable safe havens for rare animals and plants. The Rollenberg is also an important cultural monument. The entire summit plateau is surrounded by the remains of a prehistoric ring wall. The same applies to the Burgberg: An old path that is still visible today leads to an extensive prehistoric rampart.

View from the Kratzberg to the Rollenberg and the "gateway to the Ries." The Rollenberg and the Burgberg hills are Upper-Jurassic megablocks (white Jurassic or Malm).

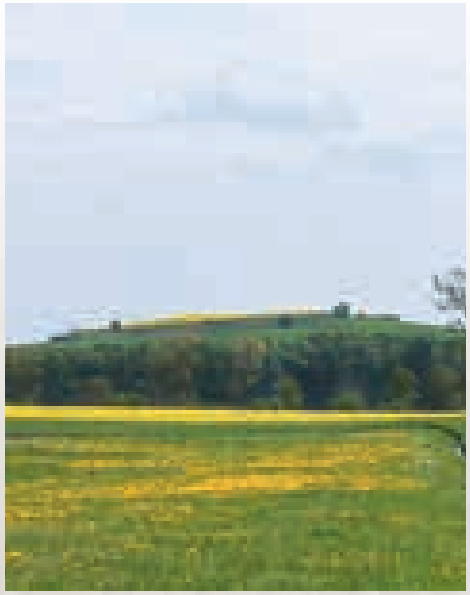
"HEXENKÜCHE" (Witches' Kitchen) 5 cave in Kaufertsberg near Lierheim

On the rocky **southern slope of the Kaufertsberg, a narrow passage leads into the hill** and opens into a **room that is open at the top like a shaft**: the so-called **Hexenküche** (Witches' Kitchen). In the cave and under the overhanging rock roof to the west, excavations unearthed clay shards, animal and human bones, stone tools as well as pieces of jewelry. The oldest finds prove that the cave was already used as a dwelling **15,000-20,000 years ago (Paleolithic)**. Of supra-regional importance is the finding of a male skull—the remains of a ritual head burial. The find is connected to the **world-famous skull finds of the nearby Ofnet caves**.



Entrance to cave "Hexenküche" ("Witches' Kitchen")

HAHNENBERG 6 near Appetshofen

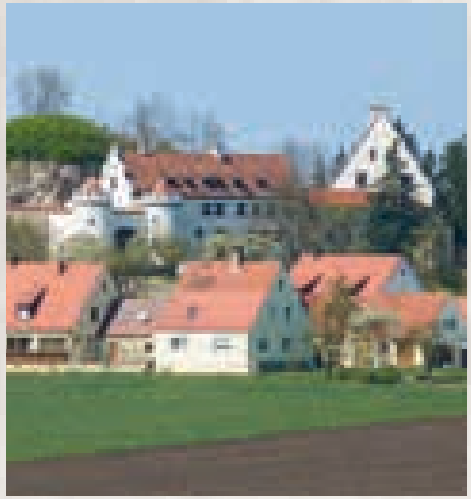


From the Hahnenberg you can see **Nördlingen, many villages** on the Ries plain and a large part of the **crater rim**. The centrally and strategically favorable location was already appreciated by Paleolithic hunters, as shown by finds from the Late Paleolithic (about 11,000 years ago). The Hahnenberg, like many elevations in the Ries, **was settled and fortified in the Paleolithic**. The partly well preserved **ramparts are recognizable as terraced terrain**. At the latest in the Hallstatt and Latène periods (ca. 8th century BC to AD 1st century) a circular rampart was built on the hilltop, probably in the form of a **wooden/stone wall**. There were **Celtic settlement sites as well as a Roman agricultural estate** around the Hahnenberg.

The Hahnenberg near Appetshofen with ring wall, viewed from the northwest.

ALERHEIMER SCHLOSSBERG (CASTLE HILL) 7

The medieval castle of Alerheim once stood dominantly on the **rocky cone near the village**. An **octagonal castle keep** gave the mighty Staufer castle a striking appearance. After the Staufers' downfall, the castle changed hands several times. In August 1634, at the time of the Thirty Years' War, imperial troops **set fire to the main castle**. Only a ruin remained in 1645 at the Battle of Alerheim. Nevertheless, the castle hill continued to play a strategically important role due to its good overview of the battlefield.



The buildings on the Alerheim castle hill that still exist today were renovated in an exemplary manner.

Schwedenweg (Swedes' Way)

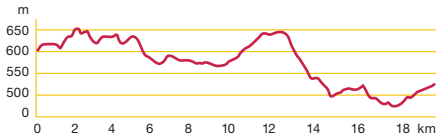
On the trail of the battle at the Ries Crater

The signposted hiking trail recalls the advance of the **Swedish-Protestant army that marched into the Ries Crater** during the Thirty Years' War. The army's march led from the Breitwang plateau into the Ries Crater to the Albuch on 5 September 1634. Along the trail, 5 info-panels explain historical contexts, troop strengths and the individual components of a 17th-century army, as well as the **course of the memorable battle on the Albuch on 6 September 1634**.

Altitude difference: ca. 220 m

Walking time: 6 hrs

Routh length: ca. 19.5 km



DB Information for hikers arriving by train:

Starting in Bopfingen at the Breitwang: The path from the train station to the Breitwang is signposted. (Path is about 2 km long.)

Starting in Nördlingen (actually the end of trail as described here): Leaving the train station, turn left to Adamstraße, then Voltzstraße, then Zeitblomweg up to the Marienhöhe park on the hill. From there, follow signs for the Schäferweg (Shepherd's Way hiking trail) to the Reimlingen Wäldchen (woods) and the Schönefeld. Here, leave the Schäferweg and travel across the valley up to the Albuch.

START AND FINISH

The starting point of the trail is the **Breitwang**, the plateau above the town of Bopfingen. From **info-panel** 1 there, the trail leads in a southerly direction. After crossing the road L 1070, follow the signs to the east. The path runs southward until crossing the county road K 3316. Follow the trail westward until you reach **info-panel** 2 between the villages of **Riffingen and Dorfen**.

The trail continues southeast through a forest on the old Roman road. It then follows the county road K 3296 in the direction of Dehlingen. **Info-panel** 3 is located next to the children's playground. The path then goes south along the Dorfstraße (village road) to the Dorfweiher (village pond). The path follows the markings at the church and then swings eastward to the crossroads with the federal road B 466, further to the north, past the Ulrichhütte (Ulrich cabin) heading east, past a right-angle bend in the road to the main hiking trail 1, then further toward the south to the parking lot, continuing east, where the trail crosses the county road K 3314. The trail continues on a forest path, past an old quarry towards the guesthouse Alte Bürg. Follow the markings on the edge of the forest in an easterly direction to **info-panel** 4. After the underpass of the B 466, continue on the heath further towards the east and then steeply downhill towards the former guesthouse "Thalmühle." Then walk in an easterly direction along the Dorfstraße (village road) through Ederheim, turn left at the end of the village, around the forest to the east until reaching **info-panel** 5 at your destination, the former battlefield on the Albuch hill.

1517 – 1648 From the Reformation up to the end of the Thirty Years' War

Matthäus Merian: The Battle of Nördlingen on 6 September 1634 (detail).

In **1517** Martin Luther published **95 theses on penance and indulgences**, which initiated the Reformation. With the help of letterpress printing, Luther's Protestant **teachings spread** throughout the Holy Roman Empire of the German Nation. Numerous princes and imperial cities, including Nördlingen and Bopfingen, **joined Protestantism** and tried to strengthen their political position in relation to the Catholic emperor and empire. Decades of smoldering controversy and violent conflict between the confessional camps followed.

In **1617** Ferdinand II became King of Bohemia. An opponent of the Reformation, he allowed Protestant churches to be destroyed and revoked the religious freedom of the **Bohemian Estates granted** in 1609. As a result, on 23 May 1618, the leaders of the disenfranchised Bohemian Estates invaded Prague Castle. They threw three imperial officials out of the window – as a **declaration of war**, so to speak. Although all survived, the "Defenestration of Prague" is considered a prelude to the Bohemian revolt, which then lead directly to the Thirty Years' War.

The **Thirty Years' War began as a religious war** but increasingly became a dispute over territorial dominance between the ever-changing warring parties. The **military conflict only ceased in 1648** with the Peace of Westphalia. This peace treaty was regarded as the basic law of the empire until its dissolution in 1806. Until its end in 1648, the war cost the lives of around five million people in the Holy Roman Empire of the German Nation.

BREITWANG 1 Nineteen days before the battle

The Swedes

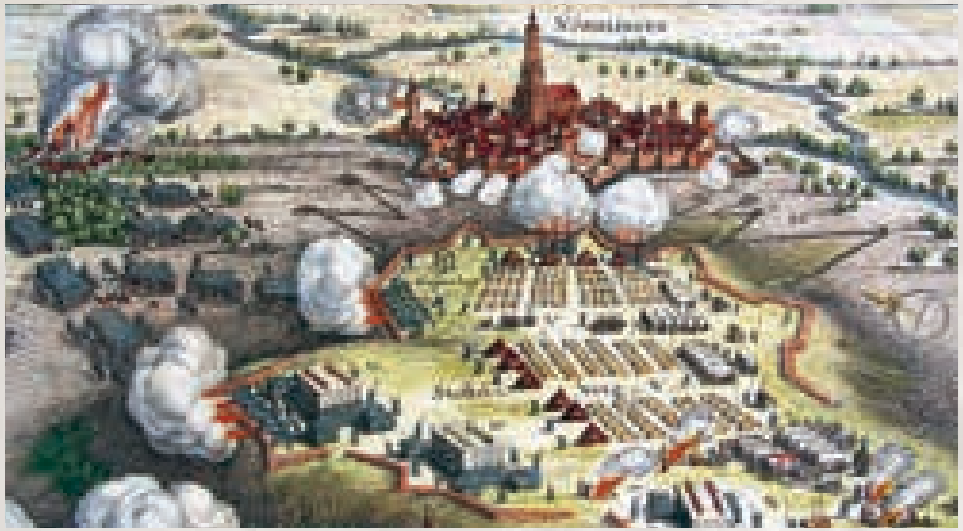
In order to oppose the imperial Catholic side and to dissuade them from their plan to advance further into the region of southern Germany, a Swedish Protestant force of about 25,000 men under the leadership of the field marshals Count Gustav Horn and Duke Bernard of Saxe-Weimar moved into their **camp on the Breitwang near Bopfingen** from 23 August to 5 September 1634.

The camp

A total of **more than 50,000 people** – soldiers, baggage train, camp followers – were encamped on the Breitwang at that time. The officers mostly had **tents for accommodation**. The ordinary soldiers had to construct a camp from available materials such as **wood, straw and brushwood**. In most cases, houses in the surrounding villages were plundered to supply the army. The town of Bopfingen, with just 1,000 residents at that time, was almost completely at the mercy of the soldiers encamped there. It is reported, for example, that the **people of Bopfingen suffered such hunger that they came to the Swedish camp to beg for food**.

The messenger

There was **visual and written contact with Nördlingen**. The city was besieged by the imperial Catholic army since 18 August 1634 and waiting to be liberated by the Swedish Protestant army. The Nördlingen messenger, Adam Jäcklin of Krauthausen (today Goldburghausen), managed to **deliver communications between the besieged city of Nördlingen and the Breitwang** a total of three times.



Matthäus Merian: The Battle of Nördlingen on 6 September 1634.
The detail shows the siege of the Free Imperial City of Nördlingen by the imperial Catholic army.

RIFFINGEN/DORFEN 2 Marching southward

Matthäus Merian: The Battle of Nördlingen on 6 September 1634. The detail shows the deployment of the army.

On the **morning of 5 September, the Swedish army set out from the Breitwang** for battle. The troops marched in a **southerly direction** at first, passing through the villages of **Riffingen and Dorfen**. In the Thirty Years' War, the march of an army was not carried out as a "loose bunch" but in a **predetermined formation**.

The vanguard
The vanguard consisted of the **dragoons**, mounted musketeers who **secured the area, reconnoitered and cleared obstacles**. The dragoons were followed by the **troops who built fortifications, plus musketeer detachments, field artillery pieces (cannons)** with their munition wagons and teams and other foot soldiers. **Cavalry units** brought up the rear.

The main force
The main force was composed of infantry, light artillery and munitions and armament wagons, with the final cavalry. This was joined by the rest of the artillery, with **small field guns, but also with large cannons**. The cannon barrels of the heavy artillery were transported separately and lifted onto the mobile assembly, the gun carriage, at the battle site.

The rearguard
The rearguard consisted of **additional infantry with regimental units, ordnance and cavalry. Dragoon units** again served as side cover for the entire procession. The advancing military formation was followed by the baggage train with civilian merchants, hawking their wares, as well as **soldiers' families**. The number of people in a baggage train could exceed the number of mercenaries in an army.

Matthäus Merian: The Battle of Nördlingen on 6 September 1634. The detail shows an army's baggage train and camp followers.

DEHLINGEN 3 To Nördlingen with 25,000 men

Unknown artist: Imperial and Swedish troops in the Battle of Nördlingen 1634, from Theatrum historicum, Marburg 1639, by Christoph Helwig.

Formed up in marching order, the army moved in a **southerly direction** past the village of **Dehlingen**. The baggage train and war office moved on in the direction of **Neresheim** and took up quarters there.

Troop strength
The total strength of the marching Swedish army was **about 25,000 men**, including about **9,000 members of the cavalry** and **16,000 infantrymen**. The army commanded about 40 different guns with crews.

The infantry
The **musketeers** were armed with **matchlock muskets**. On a belt each musketeer carried twelve measures of powder, the so-called apostles, as well as a pouch of musket balls, slow match (match cord) and materials for cleaning the musket. A forked rest was necessary to use the long-barreled musket. The **pikemen carried 4 to 5-meter long pikes**, a spear-like weapon for defense against mounted units. For close combat, both the pikemen and musketeers were equipped with **swords**.

The cavalry
The cuirassiers were **heavily armored horsemen** armed with wheel-lock pistols and riding swords. **Harquebusiers** had breast and back armor and usually carried short-barreled carbines – "harquebus" – or wheel-lock weapons along with riding swords or small swords. The **dragoons**, who actually belonged to the infantry, were a special case. Their equipment was similar to that of the musketeers. In battle, the dragoon dismounted from his horse and fought on foot.

PANORAMA VIEW 4 Ofnet caves, Roman agricultural estate, Riegelberg

The way into the Ries
To deceive the enemy, the Swedish Protestant army first **moved south, towards the Danube**. Imperial scouts reported the supposed withdrawal of the Swedes. But then the army swung **to the northeast**.

The fighting on 5 September
The **surprise was a success**. Despite fierce resistance the Swedes managed to take the Lachberg and Heselberg heights. But further attack was delayed.

The fighting on 6 September
It became apparent that the battle for the Albuch **would determine victory or defeat**. The attack was initially successful, but an exploding powder wagon brought disorder among the assault troops.

Oscar Fraas: The Nördlingen Battle on 27 August 1634, Nördlingen 1869 ("Old Style" date).

Matthäus Merian: The Battle of Nördlingen on 6 September 1634. The detail shows the site where the Swedes came out of the forest.

EXCURSION TIP

The Geopark Ries **Adventure Geotope Lindle** is located very near to the Swedes' Way. Thirteen info-boards along a circular route explain geological and ecological features.

Especially for children, the adventure station has an outdoor memory game and a kids' trail with quiz questions. The mascots "Suevie" and "Riesie" lead the way.

An outlook platform and several vantage points offer superb views over the Ries Crater and Nördlingen. As if through a "window into the Earth," the effects of the meteorite impact become clear in the Adventure Geotope Lindle. Finally, enjoy a visit to the neighboring **Literaturcafé, a Geopark Ries Culinary Partner**.

ON THE ALBUCH 5 The deciding battle

The fighting on the Albuch
During the Battle of Nördlingen, the **decisive engagements** took place on the Albuch on the **5 and 6 September 1634**. The Swedish Protestant army **suffered a devastating defeat** against the imperial Catholic army allied with Bavarian troops.

The fighting begins
Due to **misinterpreted signals**, the Swedish cavalry under Colonel von Witzleben first attacked the **eastern redoubt** on the **Albuch**, engaged in conflicts with cuirassiers and could only be saved by reinforcements. A total of 14 assaults were made on the Albuch. The **hoped-for reinforcement** by other units **failed to materialize**. Field Marshall Horn decided on an orderly retreat. This should have been covered by the units of the Swedish left wing standing on the heights north of Ederheim.

The battle is lost
However, Duke Bernard's left wing collapsed under the pressure of the imperial cavalry. **In terrible flight**, the cavalry stormed towards **Ederheim**, tearing Horn's troops with them. While the Swedish cavalry fled, the **infantry and baggage train were massacred or captured**. Field Marshall Horn was taken **prisoner**. Duke Bernard, on the other hand, was able to **escape**. The battle and, with it, the entire southern German region **were lost to the Swedes**. The **city of Nördlingen surrendered on 7 September**. After three days of plundering, the victorious King Ferdinand III pardoned the city in exchange for a large sum of money.

Matthäus Merian: The Battle of Nördlingen 1634. The detail shows the exploding powder wagon.

DONAURIES
FERIENLAND

Hiking region DONAURIES

Heavenly views

Set off and discover something new!

Discover the DONAURIES Tourist Region step by step

Numerous local hiking trails allow you to discover the DONAURIES Tourist Region step by step - whether a hike through the wooded Monheimer Alb, in the Geopark Ries with its unique crater basin and sparse juniper heaths or through the valleys of the Kessel, Wörnitz, Lech and Danube. Created according to new quality standards, the so-called top trails in the DONAURIES area, as well as some well-known long-distance hiking routes through the region, invite you to discover the joys along the paths.

Ferienland Donau-Ries e.V.
Pflegstraße 2 · 86609 Donauwörth
info@ferienland-donau-ries.de
Tel. +49 906 74-6060 · Fax -6061

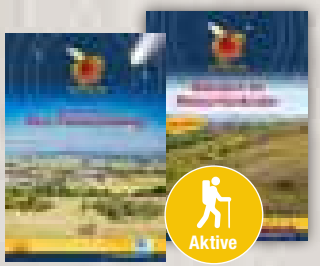
www.ferienland-donau-ries.de

GEOPARK RIES
Europe's Giant Meteorite Crater

unesco
Global Geopark Ries

Experience the crater

Explore the fascinating geology, unique nature and thousands of years of settlement history of the meteorite crater.



Request a free brochure at www.geopark-ries.de

Geopark Ries e. V.
Pflegstraße 2
86609 Donauwörth
Tel.: +49 906 74-6030
info@geopark-ries.de

EXCURSION TIP

Guided tours in the UNESCO Global Geopark Ries:
Experience the Geopark Ries up close with our expert, certified Geopark Ries tour guides! Our tours offer the **unique opportunity to clarify the relationships between geology, nature and settlement history.**
You can participate in public guided tours, or you can book an individual guided tour directly with our Geopark Ries guides. You can find further information in our brochures or at **www.geopark-ries.de**

IMPRINT

Publisher: Geopark Ries e. V.,
Pflegstraße 2, 86609 Donauwörth, Germany

Editing: Geopark Ries e. V.,
Expert teams

Text: Geopark Ries e. V. / Dietrich von Richthofen, freelance journalist

Design: dieMAYREI GmbH,
86609 Donauwörth

Maps:
Topographic maps (p. 4 / p. 17 / p. 21 / p. 27 / p. 35 / p. 41): © Huber Kartographie GmbH, 85716 Unterschleißheim, www.kartographie.de
Panorama map (p. 7): © Galli Verlag+Vertrieb GmbH, 86558 Hohenwart

Illustrations (page 6):
D. Stöffler, W.-U. Reimold, T. Kenkmann und K. Wünnemann, Museum für Naturkunde Berlin

Picture credits:
E. Birzele (p. 15 top / p. 22 top / p. 34 / p. 36 top / p. 37 bottom / p. 38 top / p. 39 bottom)
D. Denger (p.15 bottom / p. 16 / p. 29 bottom / p. 30 top)
Fürstliches Archiv Harburg (p. 24 top)
Fotostudio Herzig (p. 2)
Kaloo Images (p. 7 links / p. 8)
M. Kleebauer (Cover / p. 12 / p. 14 / p. 20 / p. 22 bottom / p. 26 / p. 29 top / p. 36 bottom / p. 51)
V.-M. Kunz (p. 31 top / p. 32 top)
M. Luff (p. 37 top)
Gemeinde Möttingen (p. 38 bottom / p. 39 top)
A. Nathues (p. 11 left)
Stadtarchiv Nördlingen (p. 40 / p. 42 / p. 43 / p. 44 / p. 45 / p. 46 top / p. 47)
Stadtmuseum Nördlingen (p. 25 middle)
G. Pösges (p. 7 right / p. 10 left / p. 23 / p. 25 top / p. 25 bottom / p. 46 bottom)
T. Schneid (p. 28 top / p. 30 bottom / p. 31 bottom / p. 32 bottom)
H. Sierks (p. 11 right)
H. Stangel (p. 24 bottom)
J. Strohhofer (p. 28 bottom)

Edition: 2st edition, January 2023

CORRECT BEHAVIOR

Help protect nature!

In the UNESCO Global Geopark Ries, the protection of nature and the preservation of the geological heritage is a top priority.

Please help and observe the following rules of conduct:

- Only stay on designated paths
- Observe all barriers and signs
- Respect the wildlife: do not disturb wild animals
- Dogs must be kept on a lead in Geotopes and nature reserves
- Do not pick plants or catch animals
- Avoid unnecessary noise
- Take garbage back home with you
- Do not make campfires
- Do not knock rocks or collect fossils
- Camping and tents are not permitted
- Quads and motorcycles are prohibited in protected areas
- Drone flights only with prior permission

Be respectful of nature and other visitors. Only together can we protect and preserve this unique natural heritage.

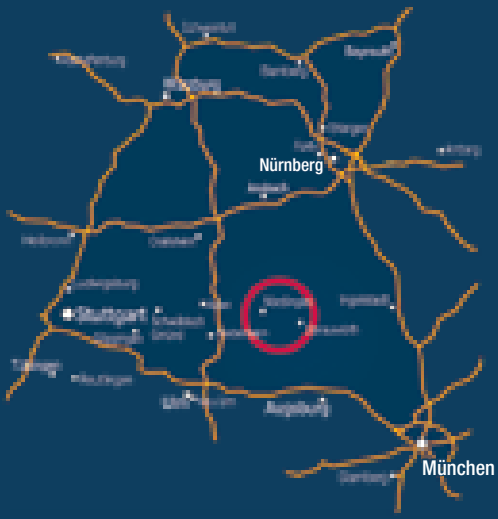
Thank you for your understanding and support!

GEOPARK RIES
Europe's Giant Meteorite Crater

unesco
Global Geopark

NATIONAL
GEOPARK
RIES

Location in southern Germany



Geopark Ries e. V.
Pflegstraße 2 · 86609 Donauwörth
Phone: +49 906 74-6030
info@geopark-ries.de
www.geopark-ries.de

Premium Partner

DONAURIES
FERIENLAND

gefördert durch
Bayerisches Staatsministerium für
Umwelt und Verbraucherschutz

For more information visit us at
www.geopark-ries.de