

Jungfraujoch

Vineri 7 August 2009

"Top of Europe" a trip to Europe's highest train station

Especially in summer, it is a unique experience to be in the middle of the world of perpetual snow and glaciers. A visit to the Jungfraujoch, part of the UNESCO natural inheritance in this region, is really a must for visitors of the Bernese Oberland.



Mönch 4099 m (13,449 ft)

The Jungfraujoch is the highest situated train station in Europe at 3,454 m (11,332 ft) over sea. It is in use since 1912. The plan to extend the railway to the summit of the Jungfrau is as old as the railway itself, but it remains a plan for the time being.

A train leaves from Kleine Scheidegg; it mostly runs through a tunnel in the north face of the Eiger. In this tunnel the train will make a short stop at the station Eigerwand (2866 m, 9,403 ft), where you can get off for a short period of

time to look down through windows in the north face of the Eiger. The next short stop is the station Eismeer (3,160 m, 10,366 ft). You will have the opportunity to enjoy the view on a world of ice.

When you have arrived at the Jungfraujoch you can enjoy a breathtaking view over the Bernese Oberland on the one hand, and the Konkordiaplatz on the other hand. The Konkordiaplatz is an intersection of several glaciers, among which the Grosser Aletsch- glacier. This region belongs to the canton

of Wallis. You can ski here, ride a snowboard or have a ride with real sledge-dogs. If you are in good shape and wear the right clothing you can walk to the Mönchjochhütte (3,650 m, 11,975 ft) where you can have a drink before you return.

An elevator brings you to the viewing point Sphinx (3,571 m, 11,716 ft). Furthermore, there are magnificent ice caves, with beautiful statues carved in ice. Be careful here; you might fall because of the slippery bottom. For those who have a lot of money to spend, there are a kiosk, several restaurants and a hotel. Metrological research is being performed on the Jungfraujoch since 1922, and there is a telescope on the roof of the Sphinx. It is interesting to know that at this altitude lightning can struck even when the sky is clear. The Sphinx is located high and is primarily constructed of steel, which makes it a potential dangerous place. However, steel cables are tightened over the terrace that serve as lightning conductors (Faraday cage) to protect you.

Sehenswürdigkeiten auf dem Jungfraujoch: [de vazut sus]

de la 11.22 la 16.00 [pret intreg 181.80 CHF/pers]

- Eispalast [palatul de gheata]
- Ice Gateway [pirtiile de gheata]
- Sphinx-Aussichtsterrasse [terasa de la sfinx]
- Plateau mit Spazierwegen im ewigen Schnee [platoul pentru plimbare in zapada vesnica]
- Gletscherrestaurant "Top of Europe" [restaurantul " Virful europei"]
- Alpine Forschungsausstellung [expozitia "cercetari alpine"]
- Sommer (Juni-September) : Ski und Snowboard Park, Polarhunde-Schlittenfahrten, Adventure Angebote, wie Tyrolienne, Snow Disk usw.

<mark>F6</mark>	Jungfraujoch						
	Basel	<mark>Pl. 06.01</mark>	IC 955	Interlaken O	S. 07.57	55	-
	Interlaken O	Pl 08.35	R145	Lauterbrunn.	S. 08.55	182	<mark>91</mark>
	Lauterbrunn.	Pl. 09.13	3345	KleineScheid.	S. 10.02	*	-
	KleineScheid.	Pl. 10.30	R547	Jungfraujoch	S. 11.22	*	-
	Jungfraujoch	Pl. 16.00	R568	KleineScheid.	S.16.50	*	-
	KleineScheid.	Pl.17.33	R470	Grindelwald	S.18.12	*	-
	Grindelwald	Pl.19.19	R274	Interlaken O	S.19.50	*	-
	Interlaken O	Pl.20.01	IC992	Basel	<mark>S.21.55</mark>	55	-





1ora si 56 min La dus:

Bahnhof/ Haltestelle	Datum	Zeit	Gleis	Reise mit	Bemerkungen
Basel SBB Interlaken Ost	07 Aug 2009	<mark>06:01</mark> an <mark>07:57</mark>	9 5	IC 955	InterCity , ≫ ∎ BZ RZ

La intors asa: 1 ora si 54 minute

Station/Stop	Date	Ti	ime	Platf	Products
Interlaken Ost	Fr. 07.08.09	dep	<mark>20:01</mark>	7	IC 992
Interlaken West		dep	20:06	1	
Spiez		dep	20:23	2	
Thun		dep	20:33	3	
Bern		dep	21:04	7	
Olten		dep	21:31	7	
Basel SBB	Fr. 07.08.09	arr	<mark>21:55</mark>	10	_

Sau asa: tot 1 ora si 54 minute

Station/Stop	Date	Time		Platf	Products
Interlaken Ost	Fr. 07.08.09	dep	<mark>21:01</mark>	5	ICE 994
Interlaken West	t	dep	21:06	1	
Spiez		dep	21:23	2	
Thun		dep	21:33	2	
Bern		dep	22:04	3	
Olten		dep	22:31	3	
Basel SBB	Fr. 07.08.09	arr	<mark>22:55</mark>	9	

5

From: Interlaken Ost via: Lauterbrunnen to: J





Duration: 2:47

Interlaken O	<mark>Pl 08.35</mark>	R145	Lauterbrunn.	S. 08.55
Lauterbrunn.	Pl. 09.13	3345	KleineScheid.	S. 10.02
KleineScheid.	Pl. 10.30	R547	Jungfraujoch	S. <mark>11.22</mark>

From: Jungfraujoch via: Grindelwald to: Interlaken Ost



Station/Stop	Date	Time	Products
Jungfraujoch	Fr. 07.08.09	dep <mark>16:0</mark>	<mark>)</mark> R 568
Kleine Scheidegg	Fr. 07.08.09	arr 16:5)
Kleine Scheidegg	Fr. 07.08.09	dep 17:33	3 R 470
Grindelwald	Fr. 07.08.09	arr 18:12	2
Grindelwald	Fr. 07.08.09	dep 19:19	R 274
Interlaken Ost	Fr. 07.08.09	arr <mark>19:5</mark>)

History of the High Altitude Research Station Jungfraujoch

The High Altitude Research Station Jungfraujoch, due to its unique location in an unspoiled high alpine environment at 3500m above sea level, the year-round accessibility via the Jungfrau Railway, and the excellent infrastructure, provides unique conditions for successful research in various disciplines. At present more than half of the projects concern environmental and climatic questions.

1. The Conquest of the Alpine Area

For a long time, the alpine area was not a place to go for the majority of people. It was considered as hostile to humans, and proper equipment, which would have been necessary to explore and to survive the alpine environment, was not yet available. Generally, the 1787 ascent of Mont Blanc by Horace Bénédict de Saussure is considered as the beginning of the touristic and scientific exploration of the Alps. The volume of his meteorological, physical and geological observations made de Saussure a pioneer of alpine research with tremendous impact. But it was only in the middle of the 19th century that scientists finally conquered the alpine area. From 1838-1841, following the example of de Saussure, Louis Agassiz, who later became Professor at Harvard University in the USA, and who was the father of the then highly controversial glacial theory, led a scientific expedition to explore the glaciers of the river Aare and in the Jungfrau region. Working and living conditions were harsh. Although the ease of the famous 'Hôtel des Neuchâtelois' was highly appreciated by team members and occasional visitors, it became clear that an adequate infrastructure is essential for successful research in the



high alpine area.

The 'Hôtel des Neuchâtelois'.

2. The Jungfrau Railways

The extensive and successful scientific activity at Jungfraujoch is a direct consequence of the easy access offered by the Jungfrau Railway. First ideas for a railway to the Jungfrau came up shortly after the inauguration of the Mt. Washington, New Hampshire (USA) railway (1869; first cog railway in the world), and even before the Mt. Rigi Railway in Switzerland started its operation (1871; first cog railway in Europe). Several plans were worked out between 1860 and 1890, including a rather humorous solution offered by the 'Nebelspalter', a Swiss satirical journal. Maurice Koechlin, an engineer from Zürich (who had worked with Eiffel) proposed building a 4 km adhesion railway into the valley from Lauterbrunnen and then scaling the heights with either five consecutive funicular sections or a cogwheel railway. Alexander Trautweiler submitted a project to transport the guests to the summit using four tunnel funiculars. Eduard Locher, builder of the Pilatus Railway, proposed propelling travelers to the Jungfraujoch in only 15 minutes by means of pneumatically operated piston-typed vehicles in two adjacent straight tubes. The main criticism of all projects was based not on the question of technical aspects but on the open question of how the human body would react to the rapid difference in altitude. Parliament eventually decided in favor of Eduard Locher's project, but this was never realized. The decisive idea for the Jungfrau Railway was finally put forward in 1893 by Adolf Guyer-Zeller, an industrialist and railway enthusiast from the Zürich Oberland. According to his plans the Jungfrau Railway should not begin in the valley near Lauterbrunnen, but from the summit station of the two month old Wengernalp Railway, at Kleine Scheidegg. The whole mountain massif was to be part of the project. Four stations along the track would offer spectacular views. Adolf Guyer also decided that his railway must be operated by electrical power, a technology which had yet to be significantly improved. New doubts about eventual physiological problems arose. The physiologist Hugo Kronecker was therefore asked by the Federal Council (which was responsible for the approval of Guyer-Zeller's project) to answer the relevant questions. Based on the results obtained during an expedition where the rapid passive transport to high altitude was simulated by carrying sample travelers in sedan chairs and with mules from Zermatt to the Theodulpass, Kronecker was able to give positive assurance. Guyer-Zeller received his building permit. In the concession he had agreed to substantially support scientific research at high altitude. Construction started in 1896. The railroad was completed in stages, with ticket revenues from train rides to the viewing platforms at the lower stations being used to finance the remaining work. Realization of the project was hampered by several disasters, including the sudden death of Adolf Guver-Zeller only six months after the opening of the first section, and the accidental explosion of 30 tons of dynamite in 1908. The remarkable railway to Jungfraujoch was finally completed in 1912, nine years later than originally planned.



The Jungfrau project proposed by the 'Nebelspalter' (a Swiss satirical journal).



The Jungfrau railway project Guyer-Zeller.

Today the Jungfrau Railway is a modern mountain railway of international repute. It makes it possible for more than 500'000 visitors from all over the world each year to enjoy a unique experience in a spectacular high alpine environment which has been awarded World Heritage status by UNESCO in 2001.

3. The First Researchers at Jungfraujoch

As soon as the railway to Jungfraujoch was completed, researchers began to profit from the possibilities this exceptional site offered, and discussions started about the construction of a scientific station. Alfred de Quervain, famous meteorologist and Greenland explorer, was the driving force. On his initiative, the Jungfraujoch Commission of the Schweizerische Naturforschende Gesellschaft (now Swiss Academy of Sciences, scnat) was founded in 1922. Only four years later, a first 'meteorological pavillon' was constructed on the glacier. From 1922-1927 E. Schär from Geneva conducted extensive astronomical observations, with the instruments placed on the open snow and ice field. The need for a shelter became obvious, and on the initiative of the Genevan astronomers R. Gautier and G. Tiercy a small astronomical observatory was built shortly afterwards. In 1928 D. Chalonge, the French pioneer in astrophysics and one of the founders of the 'Institut d'Astrophysique de Paris', made his famous ozone measurements and started stellar spectroscopy. After the discovery of the cosmic rays by Victor Hess in 1912, high altitude locations became important for the study of the characteristics of this radiation. The Jungfrau region was ideal to investigate the variations in intensity in dependence of altitude. In 1925 and 1926 Kolhörster and von Salis conducted two famous expeditions at Jungfraujoch and even to the summit of the Mönch.



Cosmic ray measurements by Kolhörster and von Salis, at the summit of the Mönch, 1926.

4. The High Altitude Research Station Jungfraujoch

After the early death of A. de Quervain it was the physiologist W.R. Hess who pushed the plans for a scientific laboratory at Jungfraujoch. Under his leadership the International Foundation High Alpine Research Station Jungfraujoch was founded in 1930. Only one year later the research station was inaugurated and extensive research started in the fields of physiology, meteorology, glaciology, radiation, astronomy, and cosmic rays. The Sphinx observatory, which was to become a symbol of scientific activity at Jungfraujoch for millions of tourists, was completed in 1937. A first astronomical cupola was installed at its roof in 1950. Due to the increasing demand for observation time and limitations in space two astronomical observatories were installed at Gornergrat in the late 1960's as an integral part of the Foundation.

The Research Station became the base of operations for all scientific work. Today the building includes four laboratories, a pavillon for cosmic ray research, a mechanical workshop, a library, a kitchen, a living room, ten bedrooms, a bathroom, and the living quarters of the custodians. Major equipment includes a machine to produce liquid air. Since the founding of the research station, its infrastructure has been continually adapted to the needs of the users (electricity, water, telephone, chemistry and medical laboratories, liquid nitrogen as coolant, fax, internet).

The scientific part of the Sphinx observatory includes two large laboratories, a weather observation station, a workshop, two terraces for scientific experiments, an astronomical as well as a meteorological cupola. The astronomical cupola is equipped with a 76cm telescope with Cassegrain and Coudé focus. Thanks to a recent large investment by the Jungfraubahn company in a terrace at the new Sphinx building, it is now possible to offer more possibilities for short-term experiments outdoors.

Two custodian couples are present at the research station in alternating shifts all the time. They maintain the infrastructure, operate the guestrooms, and act as the hosts of the researchers. The custodians are also responsible for the daily weather reports to MeteoSwiss (the official Swiss meteorological agency) as well as for the constant supervision of a number of automatic scientific experiments.



Top of Europe Restaurant Railway Station

The High Altitude Research Station Jungfraujoch.

5. Highlights of Past Research

The history of the research work at Jungfraujoch reflects outstanding results. The following milestones are worth mentioning:

- In 1950 the Université de Liège in Belgium began spectrometry measurements of sunlight. These results appeared in the first atlas of the Sun's spectrum of the frequencies between 2.8 and 23.7 μm. This atlas was produced by Migeotte, Neven und Swensson and was the basis for the later additions in the frequencies 0.3 1 μm by Delbouille, Roland, and Neven. This document is still a recognized reference worldwide on the spectrum of sunlight and is fundamental in the field of astronomy and theoretical spectroscopy.
- The research on cosmic rays done by Blackett and Wilson provided basic results closely related to two Nobel prizes in physics (Blackett, 1948; Powell, 1950). The large Wilson chamber that was built up by the two Britons in 1951 in the Sphinx observatory was later used by CERN, where it ushered in the era of modern high-energy experiments.
- The excellent transparency of the atmosphere above Jungfraujoch made it possible in 1962 for the German physicists Labs and Neckel to make the first absolute measurements of the solar constant.
- The Genevan astronomer Golay developed the 7-color photometry for the classification of stars. This means of classification was the basis for a unique catalogue which up to now includes over 40'000 stars.
- After the solar flare on June 3, 1982, the cosmic ray detector of the Physikalisches Institut of the University of Bern was able to prove for the first time the presence of high energy solar neutrons in the Earth's atmosphere.
- In 1990 the Austrian researchers Blumthaler and Ambach gained worldwide attention for the first direct measurements of the increase in the UV-intensity at the Earth.

This summary of important scientific work shows that several changes of emphasis of research at the Research Station Jungfraujoch have occurred: glaciology/medicine \rightarrow cosmic rays/astrophysics \rightarrow astronomy. In the past few years, environmental sciences have appeared more in the forefront.

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gletscherrestaurant

Meniul marcat costa

93.50 chf + 15% tip = 107.50 chf / persoana



Starters

Air cured meat	CHF 19.00	EUR 12.70
Glacierplate (Assorted dried meats, saussage and cheese)	CHF 23.50	EUR 15.70
Parma ham with melon	CHF 21.00	EUR 14.00
Smoked fera (trout) toast and butter	CHF 20.00	EUR 13.30
Soups		
Clear vegetable soup	CHF 7.00	EUR 4.70
Cream of carrot soup	CHF 7.50	EUR 5.00
Goulash soup	CHF 17.00	EUR 11.30
Lobster soup	CHF 11.00	EUR 7.30

<u>Salads</u>

Assorted salads with pine apple	CHF 22.00	EUR 14.70	
Green salad	CHF 7.50	EUR 5.00	
Lamb's lettuce with egg	CHF 12.00	EUR 8.00	
Mixed salad	CHF 9.00	EUR 6.00	

<u>Main courses</u> Beef		
Beef "Stroganoff" with rice	CHF 38.00	EUR 25.30
Fried beefsteak with morelsauce croquettes tomato and spinach	CHF 42.00	EUR 28.00
VITA-plate (Sirloin steak with assorted salads)	CHF 37.00	EUR 24.70
Veal		
Sliced veal Zurich-style rösti-croquettes spinach	CHF 36.00	EUR 24.00
Pork		
Pork schnitzel creamsauce with mushrooms noodles	CHF 29.50	EUR 19.70

Vienna-style schnitzel croquettes vegetables	CHF 29.50	EUR 19.70
Fowl		
Poached breast of chicken with taragon-sauce rice stuffed tomato and green peas	CHF 29.00	EUR 19.30
Lamb		
<mark>Grilled lamb</mark> provence-style Rösti-croquettes French beans	CHF 35.00	EUR 23.30
Fish		
Salmon stew with oriental-style vegetables rice	CHF 34.00	EUR 22.70
<u>Desserts</u>		
Cappucino	CHF 7.50	EUR 4.55
Caramel pudding	CHF 7.00	EUR 4.25
Coupe Danmark	CHF 8.00	EUR 4.85
Coupe Jungfrau	CHF 8.50	EUR 5.15
Macedoine with cream and ice cream	CHF 9.00	EUR 5.45
Meringue with ice cream	CHF 9.80	EUR 5.35
Plum sorbet (with plum schnapps)	CHF 9.80	EUR 5.95

Sorbet Colonel (with Vodka) Tiramisu (Mascarpone, Amaretto)			CHF 9.80	EUR 5.95	
			CHF 9.00	EUR 5.65	
<u>Wine by the</u>	<u>glass</u>				
<u>Red wine</u>					
Switzerland	Dôle, Cave du Paradis	20 cl	CHF 8.20	EUR 5.45	
Switzerland	Dôle, Cave du Paradis	<mark>50 cl</mark>	CHF 20.50	EUR 13.65	
France	Fleurie	50 cl	CHF 19.00	EUR 12.70	
Italy	I Sicani, Nero d'Avola 2002	50 cl	CHF 26.00	EUR 17.35	
<u>Rosé wine</u>					
USA	Beringer, Zinfandel Blush Flaschenwein im Offenausschank	20 cl	CHF 10.20	EUR 6.80	
USA	Beringer, Zinfandel Blush Flaschenwein im Offenausschank	50 cl	CHF 26.00	EUR 17.35	
<u>White wine</u>					
Switzerland	St. Saphorin AOC	20 cl	CHF 8.00	EUR 5.35	
Switzerland	St. Saphorin AOC	50 cl	CHF 20.00	EUR 13.35	

Switzerland	Fendant, Cave du Paradis	20 cl	CHF 7.60	EUR 5.10
Switzerland	Fendant, Cave du Paradis	50 cl	CHF 19.00	EUR 12.70
France	Champagner	10 cl	CHF 12.00	EUR 8.00
Italy	Prosecco	10 cl	CHF 8.00	EUR 5.35

All prices including 7.6 % VAT.

Bacsisul tipic este 15 %



