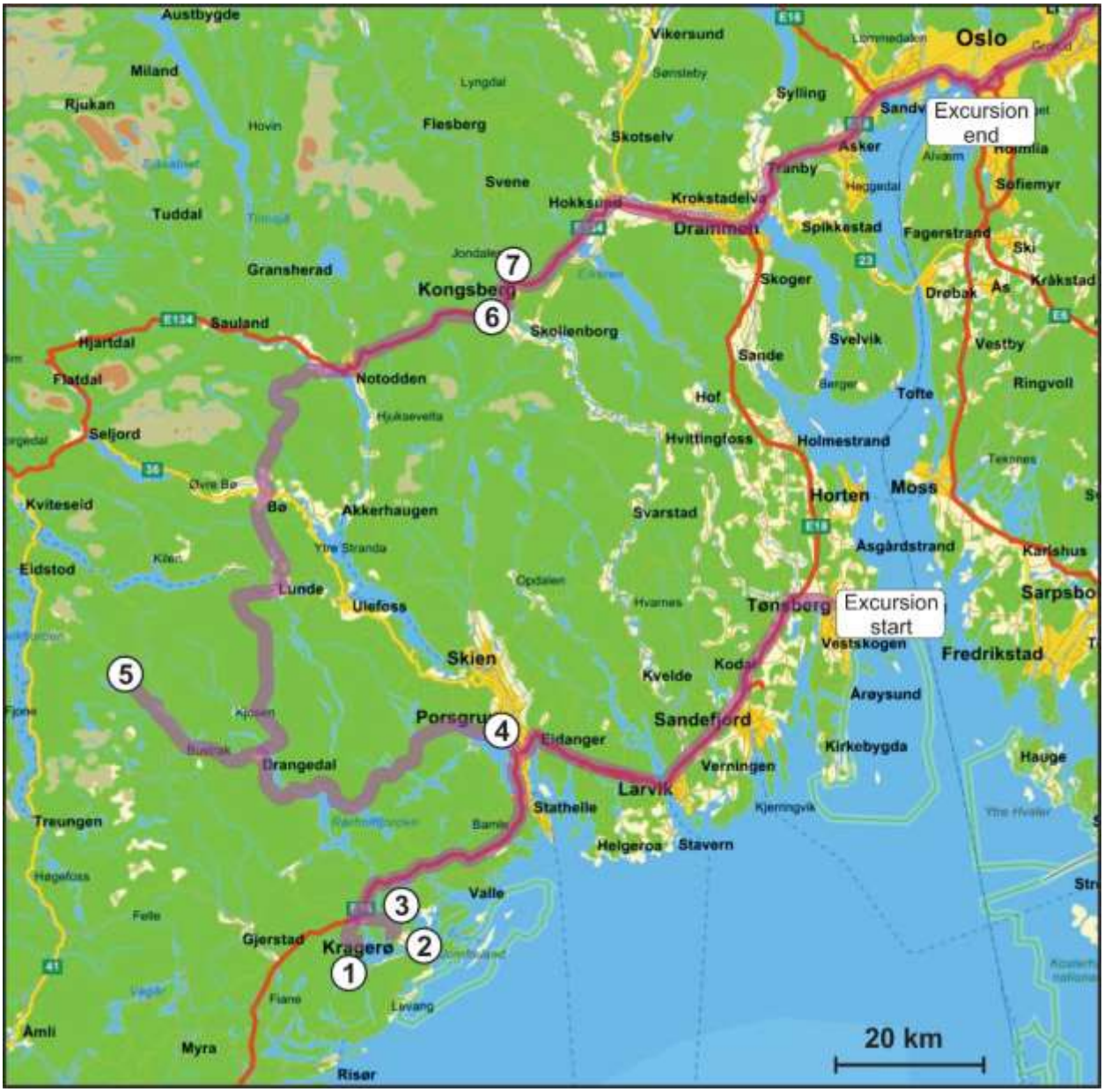
Schedule of the QUARTZ2021 excursion 8 to 10 September 2021

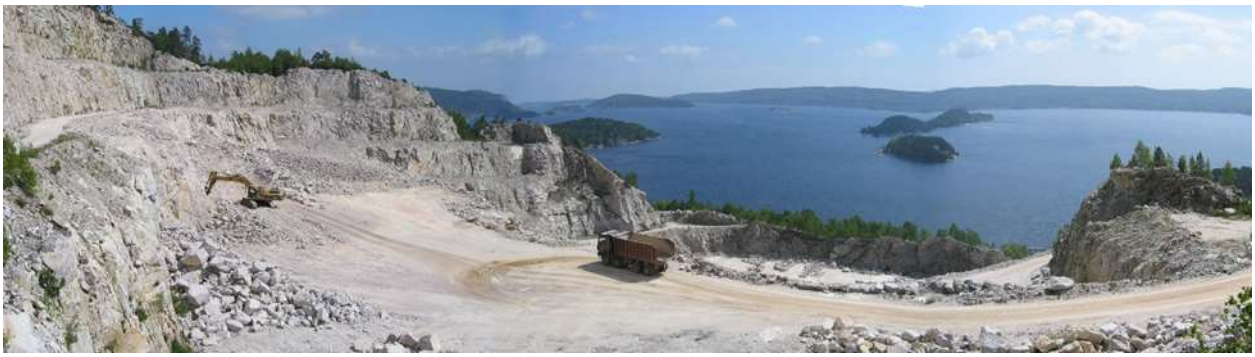
The QUARTZ2021 excursion is limited to 25 participants. Accommodation for the night 8 to 9 September 2021 will be at the Victoria Hotel at the pier of Kragerø www.victoriahotel.no You may stay at the same room where the painter Edvard Munch found inspiration for his masterpiece 'The Sun'. Accommodation for the night 9 to 10 September will be at the Kongsberg Hostel https://www.kongsberg-vandrerhjem.no/ in quiet surroundings, close to the Norwegian Mining Museum. The expenses for accommodation, including breakfast, lunch and dinner, are covered by the excursion fee. You may have to stay together with other excursion participant in your apartment/room at the Kongsberg Hostel (depending on how many people participate to the excursion).



Route of the QUARTZ2021 excursion with indicated excursion stops.

8 September 2021
Excursion starts 09:00 am in front of the entrance of the Quality Hotel Tønsberg (Ollebukta 3, Tønsberg downtown). Please, meet up c. 15 minutes before departure. You should have had breakfast before in your conference hotel. We will drive with minibuses for a 1 hour and a half to the first excursion stop.

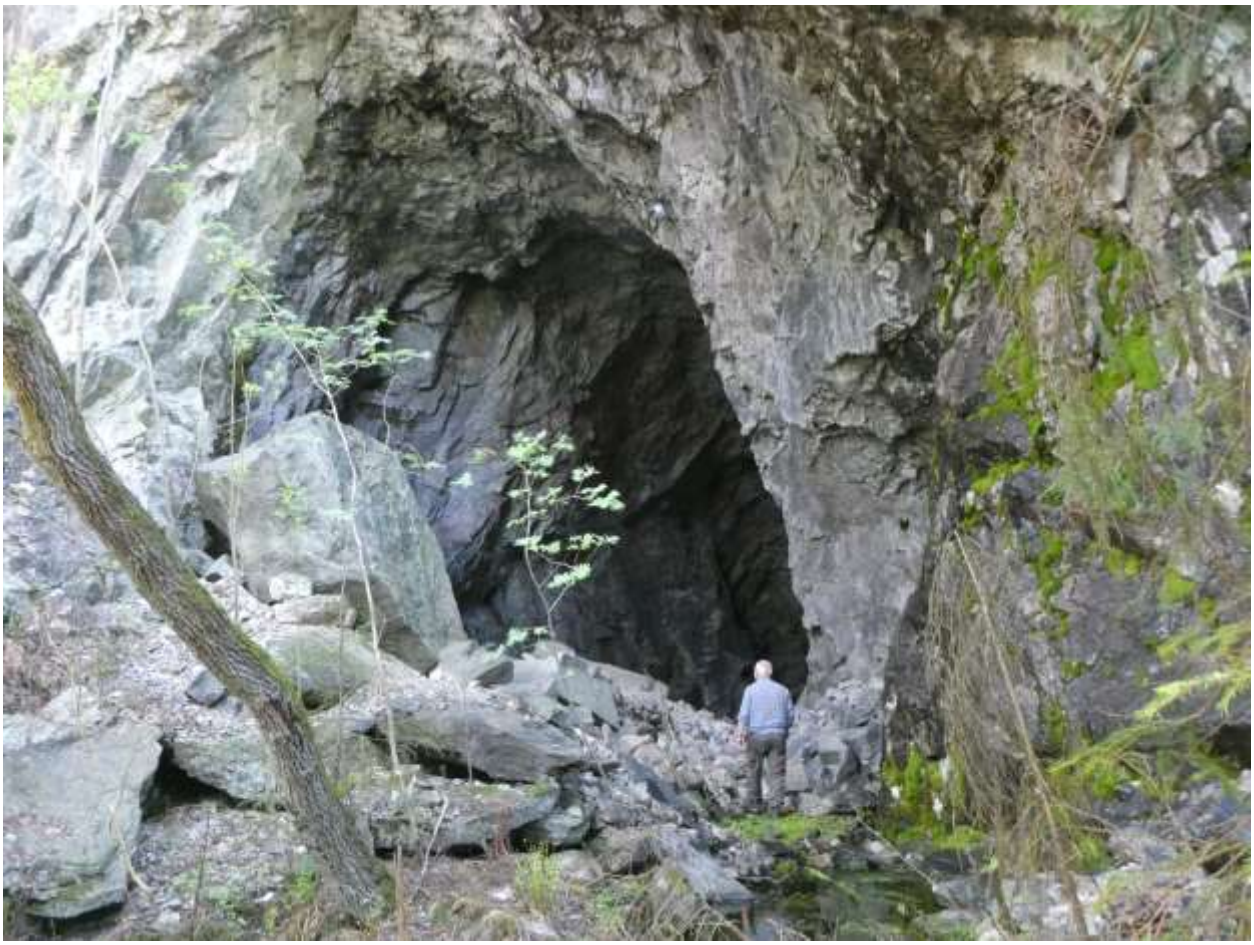
Stop 1: 10:30 - Snekkevik quartzite quarry at Kilsfjord west of Kragerø.
At the Snekkevik quarry quartzites of the Proterozoic Coastal Quartzite Complex are mined for silicomanganese production. The chemistry, petrography and tectonometamorphic history of the quartzites will be discussed in terms of what controls the quality of the raw material. We will have lunch at/near the locality.


The Snekkevik quartzite quarry near Kragerø.

Stop 2: 13:00 – Lindvikskollen pegmatite mine.
After a 30 minute's drive from Snekkevik we will arrive at the Lindvikskollen parking site west of Kragerø. From there it is a 1-km walk along a narrow, rocky hiking track to the Lindvikskollen mine. The mine is partially underground. We will provide safety. The Lindvikskollen mine, which comprises several quarries and one underground area, is hosted in one large pegmatite body. Lindvikskollen pegmatite is a typical Sveconorwegian pegmatite (c. 1100-1060 Ma) with a chemical NYF affinity. Indicative accessory minerals are allanite-(Ce), aeschynite-(Y), euxenite-(Y) and xenotime-(Y). Unusually for Sveconorwegian pegmatites is the high abundance of large schorl crystals (black tourmaline). It is the type locality of hellandite-(Y). The pegmatite was mainly mined for K-feldspar. Quartz served as by-product. Piles of quartz can still be found in the mine today. The quartz has a good chemical quality used as additament for porcelain production. The trace element chemistry of quartz will be discussed in terms of genetic and economic significance.

Stop 3: 15:00 – Tangen pegmatite mine.
From Lindviskollen it is a 2 minute's drive to the Dalaneveien parking site. From there we will work for about 1 km along a gravel road. The last 300 m to the mine we will walk along a narrow hiking track. Normally it is not allowed to access the mine. We as excursion have got a special allowance by the landowner to access the mine and it is probably the first time that an international excursion is allowed to enter the mine. Please, follow strictly the advice of the excursion guide. The mine is partially underground. We will provide safety helmets. The pegmatite has been mined for K-feldspar. Quartz may have served has by-product. In general, the Tangen pegmatite is of the

same genetic type as the Lindvikskollen pegmatite with the difference that the pegmatite melt was more fractionated. Instead of oligoclase the dominating feldspar is albite in the form of cleavelandite. The mine is most famous among mineral collectors for the occurrence of the probably world-largest phenakite crystals (Be_2SiO_4).



The Tangen pegmatite mine. Left to Alf Olav Larsen, the world-largest phenakite crystals were found.

16:30 Drive to the Victoria Hotel at Kargerø. Arrival c. 17:15. Common dinner about 18:00.

9 September 2021

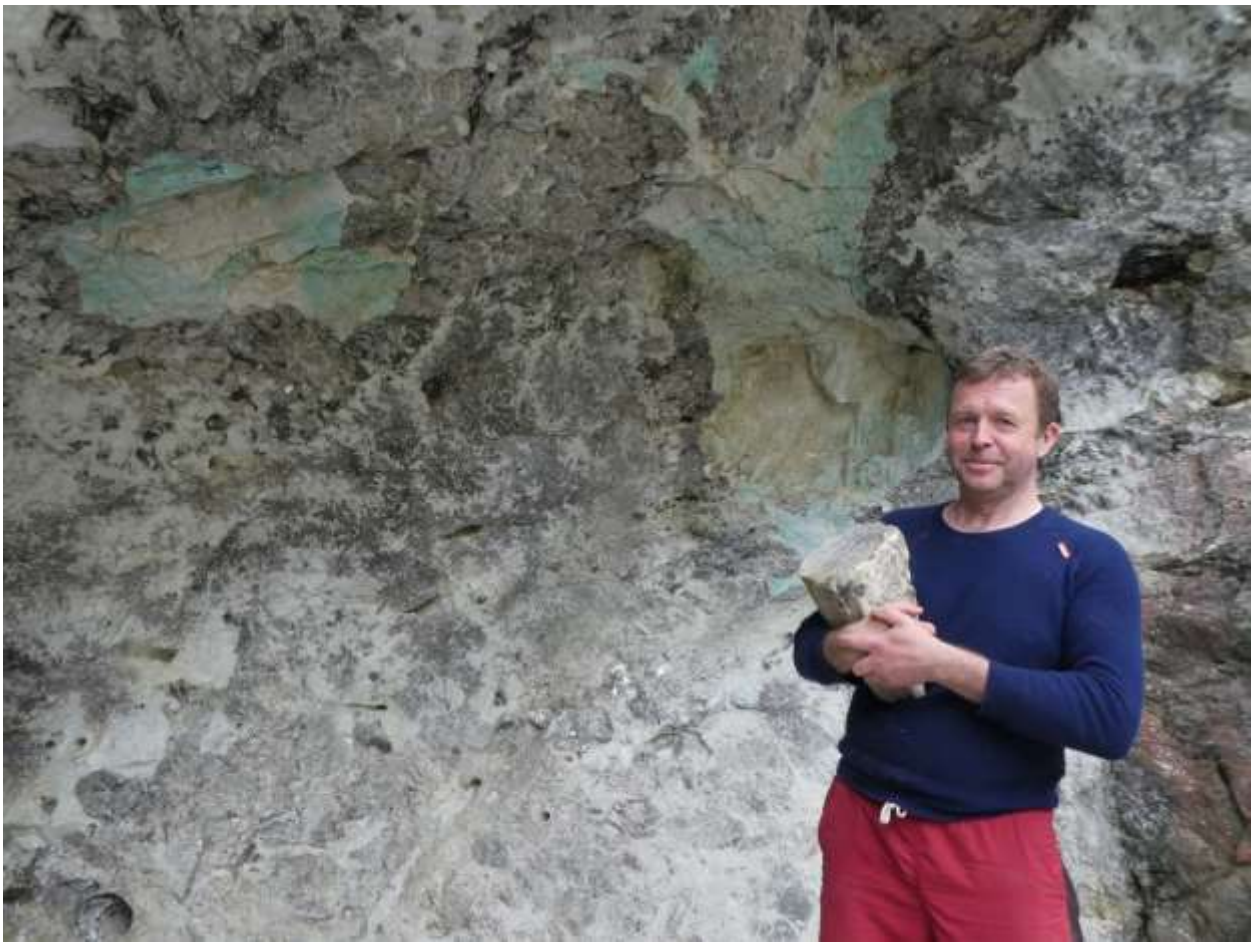
During the second excursion day, we will first visit REC Solar Norway AS at Herøya. Afterwards, we continue the trip to Tørdal, Northwest of Drangedal, to explore granitic pegmatites of the Sveconorwegian Tørdal pegmatite field in Telemark. You will have to pack your luggage because we will stay at a different hotel the coming night (9-10 September). After breakfast, we will depart from the Victoria Hotel at 09:00 am. It is 1 hour drive to Herøya, the first excursion stop that day.

Stop 4: 10:00 – REC Solar Norway AS at Herøya.

Founded in 1996, REC Group is an international pioneering solar energy company manufacturing solar panels. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific. The company aims to produce high

quality solar panels with the lowest carbon footprint. With currently 18 employees at Herøya, REC Solar Herøya produced 130 tonnes of silicon blocks in 2020 to a Chinese manufacturer who in turn supplies solar panels to the French market. The factory manager David Verdu will introduce us to the production line. We will leave the factory about 11:30.

Stop 5: 13:00 – Upper Høydalen pegmatite mine.
Arrival at the Høydalen cabin about 13:00. 13:00-14:00 Open-air barbeque at the Nedre Høydalen cottage (Seter), which is 500 m from the Upper Høydalen mine. After lunch, we climb for about 500 m to the Øvre Høydalen pegmatite mine. The Upper Høydalen pegmatite was mined for mica during WWII. It is a highly fractionated NYF pegmatite of the gadolinite-(Y) sub-type with abundant amazonite (up to 2 meter crystal size) and 'lepidolite'. It is the type locality of tveitite-(Y).


The Upper Høydalen amazonite pegmatite mine.

In the late afternoon we will travel to Kongsberg Vandrerhjem, which is a 2 ½ hour drive (150 km). There we will have common dinner.

10 September 2021
During the third excursion day the world famous Kongsberg silver mines *Kongens gruve* and *Gottes Hülfe in der Not* and the Kongsberg Mining Museum will be visited. Silver will be the

major topic of this excursion day. However, quartz associated with hydrothermal mineralisation will be discussed too. We have to leave the Kongsberg Hostel latest 07:45 am.

Stop 6: 10:00 – Kongens gruve and Gottes Hülfe in der Not mines.

The Kongsberg Silver Mines constitute the largest historical mining field in Norway with more than 200 different mines. These mines were in operation from 1623 to 1958. A total of 1,350 tons of silver were produced here, together with a substantial amount of copper. The copper and most of the silver were used in coins. The guided tour into the silver mines comprises a underground train ride along the Christian IV's adit that takes you 342 meters below the surface and 2.3 km into the mountain. The train stops in the *Kongens gruve* from where the guided underground walking tour starts. During the tour we will pass through *Gottes Hülfe in der Not* mine. The tour will take 1 ½ hour. It is 6 ºC the mine, please, take warm clothes with you. Safety helmets will be provided.

Stop 7: 12:00 - Kongsberg Mining Museum.

At the Kongsberg Mining Museum we will have a guided tour which starts 12:00. The museum hosts the world largest exhibition of native silver.

Native silver from the Kongsberg mines. With permission of the Kongsberg Mining Museum.

We will leave Kongsberg 14:00 for Oslo. We offer to deliver excursion participants at the Central Oslo Railway Station (Oslo S) around 16:00 and at the Oslo Airport Gardermoen around 17:00. Because it is Friday afternoon, delays might be possible due to heavy traffic.