



*The gravel and sand beach of Busviken is connected with the high esker at Malmen, Ekerö.
Photo: Carl Erik Johansson*

Uppsalaåsen – A long Geosite candidate in Eastern Sweden

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Uppsalaåsen is one of the biggest and most well-known eskers in Sweden, rising from the Baltic Sea SW of Stockholm, crossing Lake Mälaren in a fissure-valley landscape, passing the Uppland plain, and diving into the Bothnian Sea E of Gävle. The esker continues northwards on the bottom of the Bothnian Bay. Its supra-aqueous length is about 200 km, maximum width about 1 km, and height about 75 m.

The esker was built up at the margin of the latest inland ice at the Yoldia Sea. Its surface was reworked by waves and wave-currents in the Ancylus Lake, the

Littorina Sea, and the Baltic Sea, under varying wave direction and energy. The structures and forms of the esker show a wide variation, as shown by the following examples.

Uppsalaåsen was thoroughly mapped and described by Hjulström and his students (Hjulström 1944). Important parts of it are of national interest for nature conservation in Sweden (Naturvårdsverket 1990, 1992). The esker in Ekerö is shown by Johansson (2000).

The numbers N AB 23, N C 36 etc. refer to sites of national interest for nature conservation (N) in Stockholm county (AB, and Uppsala county (C). Many esker parts are protected as nature reserves, like a string of pearls.

Ekeröåsen

The esker protrudes from Lake Mälaren in Ekerö as a hilly island and continues from Sandudden promontory with the big esker complex of Malmen. As seen from gravel-pit exposures the esker is built up in connection with a bedrock fault. The esker core with its horizontal bedding of sandy layers and layers of cobbles, pebbles and gravel ('rullstensgrus') is laterally delimited by ice-contact structures. It is over-lain by mighty fore-set beds covering it with an 'esker mantle'. These ice-tunnel-mouth deposits are gradually fining distally and laterally as varved sediments. There are also kettle-holes. The surface of the esker was reworked by wave-action. The large esker plateau has a cover of wave-sorted sand, gravel, pebbles and cobbles ('esker coat') filling dead-ice depressions. The wave-exposed sides of the esker are gently sloping abrasion surfaces with lagging boulders, whereas the lee-sides are covered with wave-transported, evenly sorted coarse surge gravel ('svallgrus'). The upper surface is characterised by gravel and shingle ridges, and a system of bars and terraces. They were finally formed by the Littorina Sea. There are some boulder-paved littoral benches and terraces in wave-exposed lower levels along the esker.

The cobble- and pebble-rich crest ridge at Malmen is more than 50 m high. From a view-platform on the crest-ridge N of Ekerö Church the landscape panorama is very scenic, and on the esker a great many littoral phenomena and forms are seen along a walking-path. The esker continues northwards along along the deep Långtarmen Sound with crest-ridges and flat upper surfaces, hills, ridges, nets of ridges with deep esker grabens, and kettle-holes.

At Skytteholm (N AB 23) the esker dives into the Långtarmen and appears as a small island before it continues as a protruding ridge and a series of hills and ridges. In parts the wave-reworked esker cap contains enriched shell fragments of bivalves and gastropods of Littorina Sea age. Some layers are bluish from shells of the common sea mussel.

There is a long, well-marked, popular walking-path arranged by Friluftsförbundet and Munsö IF along the esker in Ekerö and Munsö. At Husby in Munsö the famous Viking Age mound 'Björn Järnsidas hög' is situated on the esker, near the lake. North of the mound the big gravel-pit of 'Gropen' has created a ground-water pool, called 'the Blue lagoon' adjacent to Långtarmen. It has very clear water and is popular for swimming and diving.

Further to the north there are hills and ridges of various shape, dead-ice depressions, shingle fields, littoral ridges, benches and terraces. The esker is widely and deeply excavated around Lötén in N Munsö. From here



At Skytteholm the esker forms islands and the esker spit Huvududden. Skytteholm was owned by Johan Skytte, teacher of Gustaf II Adolf and governor of the Swedish Baltic provinces in the 17th C. The statue is a replica of a Carl Milles' masterpiece and a symbol of the Olympic Games in Beijing 2008. Photo: Carl Erik Johansson

much ballast material is transported by boat to Stockholm. Malmhuvud is a protruding esker hill island. To the north the esker appears as a string of reefs and low islands.

Uppsalaåsen N of main Lake Mälaren

The mightiest part of Uppsalaåsen is 'Rösaringsåsen' ('the esker with shingle heaps'), N AB 16. It is a more than 60 m high esker complex with a wave-formed hill, kettle-holes, gently sloping sides, well-developed littoral ridges, terraces and benches from the Ancylus Lake and the Littorina Sea, and man-made cobble heaps from the Bronze Age.

Lilla Ullfjärden (N AB 19 – N C 36) is a deep fissure-valley lake in contact with the hilly eskers Bålstaåsen–Granåsen. The lake is connected with Stora Ullfjärden by a channel through a transverse esker spur. Lake Lilla Ullfjärden has clear water and ice-sea relicts. The esker hills and ridges along the western shore of Stora Ullfjärden have mainly steep slopes.

Sandviksåsen ('Sand Bay Esker', N C 35) is a high esker along the eastern shore of Stora Ullfjärden, with protruding shorelines from the Littorina Sea.

Arnöhuvud (Arnö Head, C 34) is a dominating promontory at the southern shore of Ekoln bay. It is a high transverse esker hill, steep slopes and well-developed shorelines, mainly from the Littorina Sea. On the crest of the hill there are ancient mounds.

Kungshamn-Morga (N C 28) along the eastern shore of Ekoln bay S of Uppsala is characterised by esker ridges, esker grabens and kettle-holes. Partly a lot of dead-ice depressions make the esker look like a kettle-field that is unique to the province of Uppland.

Along the River Fyris by Ultuna and Uppsala the esker makes up a series of ridges and hills, partly with steep slopes facing the deep river valley that is covered with thick late- and postglacial sediments. There are springs at the foot of the esker, the most famous one Slottskällan below Uppsala palace. Most drinking-water in Uppsala is from esker groundwater reinforced by infiltrated water from River Fyris. The drinking-water has good quality, but is rich in calcium.

North of Uppsala the esker continues with ridges and hills. At Gamla Uppsala ('Old Uppsala') there are monumental Viking Age mounds.

Björklinge-Långsjön (N C 25) is a long lake, partly in an esker graben along the strongly wave-reworked esker N of Uppsala. It is partly fed by groundwater. Its clear, calcareous water precipitates Chara lime and is unique for a plain-land lake.

Vikstaåsen (N C 16) forms the highest part of the esker N of Uppsala, 75 m a.s.l. Its crest ridge is the largest cobble-field in Uppland. There are also lower littoral ridges and terraces. Adjacent to the esker are several springs.

Ambrickafältet at Lower River Dalälven (N C 5) is a large field of wave-reworked sand from the esker. The surface shows more or less continuous beach-ridges and curved spits. Its western limit is a rather steep bench.

Billudden (N C 1) is a protruding esker promontory into the Bothnian Bay just east of the River Dalälven delta mouth. There are shingle-fields, more gravely littoral ridges and curved sand spits. Recent littoral processes under land uplift elucidate the formation of up-lifted forms, such as spits and lagoons. There are also migrating sand dunes, unique for the region.

The esker continues on the bottom of the Bothnian Sea from where sandstone and limestone material is derived, seen as glacially and glaciofluvially transported cobbles and pebbles, etc. The limestone influences the groundwater of the esker and its surroundings in Uppland. Here the lakes are less sensitive to acidification than in areas without lime.

Uppsalaåsen – a string of pearls

Summing up, the Uppsala esker with its string of geoheritage pearls is one of ca 100 Swedish Geosite candidates under consideration. It has a high geodiversity with regard to landscape, natural and man-made landforms, in large and detail.

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History of Geoconservation

24-25th November 2006, Dudley, West Midlands Draft Programme

The Geological Society of London's Geoconservation Commission and History of Geology Group, along with English Nature and the Black Country Geological Society are holding a two day conference, presentations and field visits, exploring the History of Geoconservation.

The conference will be held in Dudley, an area rich in geology and with a long history of involvement in the conservation of geological sites and specimens.

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The 2006 meeting of ProGeo WG1

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The annual meeting of ProGeo Working Group 1 was held May 22-28 2006 in Sarajevo, Bosnia-Herzegovina. It was combined with a national scientific symposium and a four-day field excursion.

Preparing to the meeting in Bosnia, we often remembered news and pictures during nineteen years of war, especially in Mostar, Sarajevo and Srebrenica, where the horrors and murders were endless. But, during this meeting and field trips we were surprised by silence and peace, by the warm cordial hospitality, not only by organizers and known ProGEO friends, but by all participants from Bosnia and Herzegovina and by the public.

We met respect and hospitality everywhere in Bosnia, Herzegovina, and Srbska Republika. The hospitality integrated with beautiful forests and vegetation, with springs of clean crystalline waters and geosites and natural parks, provided us with specific pleasure and with strong impressions, which we never will forget. Now we are talking to all people at home about your beautiful country and about the wonderful days we had with you Galiba Sijaric, Mensur Omerbashic and other friends. Thank you very much again!

The scientific conference was a new important contribution in ProGEO WG-1 activity. The participation of the Sarajevo authority and the greetings by the Minister of the Environment Protection was important as an evaluation of the meeting and to the field of geoheritage. We can especially list the following main elements:

- Participation of specialists from almost all Balkan countries.
- High level of preparation of the book of Proceedings.
- Well organized scientific session and field trip.
- Good presentations. Here I would like to stress that amongst the interesting presentations of colleagues from Bosnia there were some very concrete scientific papers presenting new subjects and future steps of WG-1 as well as new directions in the field of geoheritage.



Beginning of Neretva canyon. Photo: N. Kazanci

Trips, geosites and geoparks

The itineraries of the field trips were designed with care, giving us the possibility to visit all parts of the country with the most interesting geosites and geoparks. Geological aspect was included in details. We have seen carbonate and flysch formations, metamorphic rocks of Paleozoic and molasses with coal beds in inner depressions.

First Day: South Bosnia (Herzegovina).

Stop 1. Bradina Paleozoic area-amphibolite outcrops: A geosite of geological-scientific and didactic values of national importance.

Stop 2. Jablanica gabbro pluton: A geosite of didactical character of Balkan importance.



The repaired Drina bridge. Photo: N. Kazanci

Stops 3, 4, 5, 6, 7, 8. The Neretva River canyon: A large geosite of international importance. It has an aesthetic view in all its prolongation and tourist-geotourist values. A national road crosses it. In Albania we have some such large and deep canyons, but some of them are destroyed by national roads.

Stop 9. Source of the Buna River: It is very specific big karst spring. In Albania we have the "Blue Eyes", "Black Eyes" and Viroi springs, but Buna spring is much bigger (41 000 m³/s). This karst spring together with the complex of large karst field above it and to the east, represents a rare example of karst processes concerning huge sizes and beautiful aesthetic karst landscapes. I have not seen anywhere similar spring and karst field in Balkan.



Buna spring. Photo: N. Kazanci



Photo: Kravica waterfall. Photo: N. Kazanci

Stop 10. The Kravica waterfall. It represents a very nice geosite of Balkan importance of tourist and geotourist values.

Second day: Central Bosnia

Stops 1, 2: Sarajevski Kiseljak mineral water: It represents a unique geosite on a European level. I never have tasted such mineral water as in Kiseljak.

Stop 3. City of Travnik: It represents a good example of the integration of cultural heritage with natural heritage. In my opinion Travnik is of regional importance concerning its complex values.

Stop 4: A beautiful lake, water springs with water mills, waterfal, travertini, integrated with historical monuments of Jace are a rare example of international importance.

Third day: Eastern Bosnia.

Here the first geosite was the karst hole formed by a river through limestone rock. It is very interesting geosite of national importance. While erosional pyramids are of local importance. A lot of high erosional pyramids covering large surface are formed in Belogradchik and in some other places in Bulgaria and Greece.



Pyramids of Bosnia. Photo: N. Kazanci



Bed surfaces of a Mesozoic flysch. Photo: N. Kazanci

“Sutjeska” National Park, is a big forest park with waterfalls and some other geosites. It represents a geopark of the international importance with complex biodiversity values, and with very good management. The same can be said about the Sarajevo Park and River spring.



A happy group in Sutjeska national park. Photo: N. Kazanci

Fourth day: Sarajevo surroundings. The Sarajevo area is rich in interesting and very nice landscapes known from former Olympic Games. The Skakavac cave is astonishing not only by its large underground rooms and paths, but with numerous colloidal forms of aesthetic view. It is a lot of caves in Slovenia, Bulgaria, Croatia and elsewhere; but this is one of the best and biggest caves in Europe with a good management.

Web site working report

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Since the last issue of ProGEO News I have continued to perform daily maintenance of the site. A number of broken links and minor flaws are now fixed. To be able to “move around” on the site in a more practical way (according to modern web standards) I have changed all the external www-links and all the linked pdf documents (Lord it was many) so that they now open in a separate window.

Our articles page has waited long to be updated with the amendments made in 1999 in Madrid. This has finally been done.

Many members have asked for keywords to be included in (the code of) our web site, so that internet web search finds our site quicker, more easily and with higher ranking. I have finally looked into this issue and it is possible and simple to add a number of keywords, but please know this. This was true some years ago, but many modern web search engines do not use key words in their search. Some still do, but it is actually beginning to be yesterday’s technique. What most of the search engines use are the words in the bulk text on a page and the words in the web browser’s title bar, i.e. the text that appear in the top bar (e.g. the topmost blue bar in Windows XP). This is the reason I have added a title to all main documents on our site. A title is not the same as file name. Please check out the different titles of our site’s pages in the web browser’s title bar.

Please also try to find the ProGEO web site through web search. Now with titles added it is no problem to find us. You will also notice that some strange companies also hold the name ‘Progeo’.

Another technicality about keywords is that they are page-bound, i.e. the keyword has to be added to a specific page with that word present on the page, to work at all. To pump in all keywords you can think of in the code of the first page is, in other words, not the way it works. What I anyway can do perhaps later this summer, when the list of obligatory things to do is shorter, is to add the relevant (= present in the text on the page) keywords to the main pages of our web site. This is no guarantee for better search hits, but just to be extra safe.

Please again remember that if you want information to be added, changed or deleted from the web site it is YOUR task and responsibility to inform me.

So please look at for example “your” pages with local information and check if they are updated.

Any new book to announce?

A new national contact?

Are addresses ok?

Are all the meetings listed?

Minutes?

I will be glad to help and I need your input.

www.progeo.se

Excursions in the Belt of Yotvings

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In connection with the conference 'Geoheritage for sustainable development' excursions were arranged in the belt of Yotvings: around and in River Nemunas valley in S Lithuania, and in the ice-marginal zone in NE Poland. The excursions gave good views of the geoheritage and its importance for tourism and knowledge of landscapes. They were very well arranged and guided.

The Yotvings belt in Lithuania is deeply influenced by River Nemunas and its tributaries with winding courses in mighty late-glacial and glaciofluvial deposits. We had the opportunity to visit and get good information of a number of sites representing varying geology, morphology, processes, and landscapes.

Site 1. The deep, wide Raigardas valley is a good example of the inheritance of paleo-topography. Much glacial and glaciofluvial erosion and accumulation took place at the end of the Baltic glaciation. River Nemunas river formed a series of remarkable cirques deeply influenced by suffosion. The unique environment provides opportunities of recreation. This impressive site inspired the great Lithuanian artist and composer M. K. Ciurlionis to paint the triptych 'Raigardas'.

Site 2. The rich 'Bobos darzas' spring and its outlet were flooded by a beaver dam.

Site 3. The Cirstai suffosian circus in a dune massive has abundant spring flow.

Site 4. The Bakanauskai mire, developing from a lake in a sandy plain, is a transitional wetland complex.

Site 5. The dune of 'Gaidziu Galas' in Marcinkonys village, favoured by roosters, is the only still free dune in the Dzukija National Park.

Site 6. The Ula outcrop on the right bank of Ula River downstream from Manciangire village is formed by meandering and braiding in sandy sediments covered by wind-blown sand. The river is popular for, e.g., canoeing.



Quaternary formations are demonstrated at 'Gaidziu Galas' dune. Photo: Carl Erik Johansson

Site 7. The spring 'Ulos Akis' (Ula's eye) in a suffosian hollow in the left river terrace of the Ulos is fed by groundwater from inter-till horizons.

Site 8. The town of Punia is situated on the old Punia mound at the confluence of River Nemunas and the Panele rivulet. The hillsides are steep, about 30 metres in height. The mound is one of the most interesting and beautiful in Lithuania.



Parts of the excursion group on the Punia mound. . Photo: Carl Erik Johansson

Site 9. 'Ozku Pecius' (Goat stove) is a high, steep outcrop situated on the right bank of the Verknè River. The outcrop is stabilized by a conglomerate of inter-till layers cemented with calcium carbonate precipitated

from groundwater. It was formed during the Gruda and Baltija stages of the latest glaciation.

Site 10. Increasing rain gave us the opportunity to visit a fine museum in Birstonas and see a film presenting a beautiful and interesting landscape.



The Regional Park Museum in Birstonas displays beautiful views of the Nemunas landscape. . Photo: Carl Erik Johansson

A river-boat excursion in River Nemunas and its valley at Druskininkai gave inspiring experiences of a fascinating landscape with integrated natural and cultural values. The landscape has a high potential for tourism and knowledge of land-forming processes.



River Nemunas landscape S of Druskininkai. . Photo: Carl Erik Johansson

Suwalki Region, Belt of Yotvings in NE Poland is characterised by marginal formations of the Vistulian glaciation and shows a very scenic landscape with hills, valleys and lakes.

At the Hydrogeological Observation Station in Sidorówka the thickness of the Quaternary complex amounts to 270 m. Water-bearing sediments are inter-layered with tight sediments. The scenery of the Suwalki Landscape Park could be studied from the top of the Cisowa Mt, 79 m above the water level of the nearby Kopane Lake. The hill is part of an end moraine. There is a diversity of eskers, terraces, kames, dead-ice moraines and end-moraines in the Szestupa depression.



Alma Grigienè and Jonas Satkunas, leading conference arrangers, on the top of Cisowa. . Photo: Carl Erik Johansson

The Hancza Lake is the deepest lake in Poland. It has boulder-rich shores and clear water. The main phase of its formation was during the Vistulian glaciation. It is a water reserve, situated in a landscape protection area.

The Bachanowo Boulder field shows a big concentration of erratic boulders in four levels above the adjacent river. The boulder enrichment seems to be lag deposit after outwash of finer fractions.

The Suwalki Anortosite Massif beneath the cover bedrock 800 to 1,800 m below the Quaternary land surface contains bodies of magnetite-ilmenite, more than 1,6 billion tons, with iron contents from < 20 to > 20 %.

There are bore-cores from 83 drillings collected in the Central Geological Archive in Szurpily.

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ProGEO symposium in Ukraine, September 2006

Dear friends,

As you know, in September 2006 is the Symposium and field excursion of ProGEO:

September 3. – Arriving,
September 4–5 - Kyiv meeting,
September 6–8 - Kamianets-Podil'sky field excursions
September 9 – Departure.

Now deadline is coming for the transferring of money of the organization charges.

Fees to be paid through money transfer to bank:

- 1) Kyiv meeting: 35 Euro
- 2) Kamianets-Podil'sky field excursion: 210 Euro (total 245 Euro).
- 3) Hotel "Ksenia" accommodation will be from 60 Hrivnas per night (for each person) – double room to 300 Hrivnas per night – single room. Two nights stay.

Fees to be paid cash at the desk of the hotel in Kyiv: Sanatorium "Pouscha Ozerna": 150 Hrivnas per night (for each person) – double room and 300 Hrivnas per night – single room. Food included. Two nights stay.

For meal in restaurant additional cost is from 20 Hrivnas (max depend on appetite).

Today's exchange ratio is 1 Euro = 6.42 Hrivnas.

We expect to rent bus (buses), motor ship, sleeping saloon in train, organize hotel reservation and hope to solve as many small tasks as possible before the start of the Symposium.

If you take part in Kyiv Symposium and Field excursion let us know by e-mail. Please, send us copy of bank order (for statistic) and details of your trip to be able to meet you and for send-off.

At the Airport and Railway station our representatives will be there with ProGEO tablets.

Transferring possibilities:

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3 - You can send money by Western Union to: Volodymyr Grytsenko 47 apt, 68/1 Peremogy prospect, 03113 Kyiv, Ukraine)

Best wishes,
Volodia

Deadline for the next issue of ProGEO NEWS: 15.9.2006

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