Key characteristics that require explanation include: 1) igneous crustal thickness versus mean igneous seismic velocity relationships for magmatic underplated bodies on the Norwegian-Greenland conjugate margins that indicate a cooling trend and seismic velocities that point to a moderate or non-existent mantle thermal anomaly during and after breakup; 2) rapid along margin variations in the observed igneous crustal thickness that suggest a local lithospheric control on melt productivity; 3) significant asymmetries in melt production existing between the Norwegian-Greenland conjugate margins; 4) post-rift magmatic activity 30 my after breakup with igneous seismic velocity indicating normal mantle temperature; 5) anomalous low magmatic productivity in the oceanic Norway Basin following moderate excess productivity that suggests anomalous low mantle temperatures following breakup, 6) anomalous mantle lithosphere thinning in the distal margin in the late syn-rift, 7) uplift and erosion of highly thinned crustal blocks in the distal margin. Forward numerical models of passive margin formation and melt productivity suggest the following key controls: 1) rifting over mantle with a moderate to non-existent thermal anomaly (0-50 C), 2) small scale convection during continental breakup resulting in removal of mantle lithosphere, 3) associated enhanced active flow through the melt window resulting in excess melt, and 4) return flow of dehydrated and depleted material into the ridge area resulting in melt starvation. Post-rift small scale convection below the margin can explain magmatism 30 my after breakup.

IDA

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Since Darwin's time, palaeontologists have made important discoveries of fossils that have begun to uncover our prehistoric ancestry. Our recent evolutionary history, spanning the last 4 million years is well documented. But older fossils are very scarce, and scientists have only had fragments of fossils to study. Now Ida (*Darwinius masillae*) is rewriting the history of our earliest origins. She is the most complete primate fossil ever found and has features placing her close to the base of the branch which leads to monkeys, apes, and humans.

The strategy for the research and the outreach work on Ida was done in parallel. This fossil was described by an international team for two years. The last year a documentary film team followed us. A television documentary, a book and a website were launched at the same day as the scientific paper on a press conference in New York. The goal of the outreach was to move the perspective of non-specialists on human evolution from ”something that happened a few million years ago in Africa” to ”we have relatives 47 million years ago”. In the hours after the press conference Google changed its logo as a tribute to the fossil, and Ida was the Google logo worldwide for 26 hours. 1,2 billion people clicked on the logo, to read about the fossil, this makes it the fastest outreach of any scientific paper ever.

Many different controversies have followed since the publication on the 19th of May 2009:

- The relationship to monkeys is disputed
- The team choose to publish in an Open Access journal (Plos One)
- The fossil was bought from a private collector for an substantial amount
- The documentary and popular book were made during the research and not in hindsight as is usual
- Ida was published in the Year of Darwin, when a lot of scientists had planned large events to promote themselves
- The outreach was not done in cooperation with international science journalists

Ida is now a popular icon and numerous manipulated pictures, videos and cartoons have been made.

A new marine reptile assemblage from the Agardhfjellet Formation (Late Jurassic; Volgian), Svalbard, Norway

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Recent fieldwork the Norwegian archipelago of Svalbard has revealed a rich and unique fauna of plesiosaurs and ichthyosaurs from the Late Jurassic black shales of the Slottsmøya Member of the Agardhfjellet Formation. The sediments were deposited in a low oxygen shallow marine environment on the Barents shelf. Molluscan and foraminiferal biostratigraphy indicates a Middle Volgian age of the unit. To date, approximately 55 individual skeletal occurrences have been mapped, of which 12 have been excavated. The most fossiliferous layer is restricted to a 55 meter interval within the 70-100 m thick section. Cranial and post cranial remains of 15 ichthyosaurs have been documented. Long-necked plesiosaurs appear to be the most abundant remains. Of these three show similarities to *Kimmerosaurus*, a Tithonian taxon from England. The partial skeletons of two gigantic (15 meter long) short-necked plesiosaurs referable to the genus *Pliosaurus* have also been recovered. The individ-

ual skeletons show variable degrees of articulation and frost fracturing, but are generally little or uncompressed. The Slottsmøya assemblage is important in being one of the richest marine reptile localities found in recent times, and in being one of few known from high paleolatitudes. It also provides important comparative data with earlier and contemporary faunas like those of the Oxford and Kimmeridge Clay Formations in Laurasia and the Neuquen Basin in Gondwana.

Sedimentological and spatial investigation of sandstones in the De Geerdalen Formation as a potential reservoir for CO_2 storage, Svalbard

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Sedimentological data were obtained for the De Geerdalen Formation (Upper Triassic) from outcrop studies at Edgeøya, Hopen and central Spitsbergen to reconstruct the paleogeographic development of the formation and to consider its reservoir potential. Data from east to western parts on Svalbard, both from earlier and ongoing studies, makes it possible to assess the formations changing sedimentation pattern. Lateral variations were mapped by logging several vertical sections in adjacent areas and helicopter based LIDAR-scans were taken at Edgeøya to be used for later spatial studies of sandstone bodies. Good exposures, especially in the eastern part of the Svalbard archipelago give important information on unit thicknesses, lateral and vertical facies variations and spatial distributions of sand bodies. This investigation is a part of the Longyearbyen CO_2 project, aiming to store CO_2 in bedrock below Longyearbyen, where sandstones from De Geerdalen Formation are the expected target.

Earlier studies, using sedimentological data and seismic interpretations, have suggested the De Geerdalen Formation to represent a shallow marine to prograding delta deposit (Mørk et al. 1982). Recent studies of the Middle and Late Triassic succession show prograding clinoforms from ESE, likely to represent De Geerdalen Formation east of Svalbard (Riis et al. 2008).

Our data support the later studies also indicating a dominating ESE source. On central Spitsbergen the lower part of De Geerdalen Formation contains fine-grained sandstone units with thicknesses up to 5 m, representing storm (hummocky) and shoreline deposits. Sandstones in the upper part have greater thicknesses up to 15 m, displaying both channel systems and tidally influenced shoreface deposits. The coarsest grain-sizes found in the sections are medium-grained. Measured sections on the eastern part of Svalbard contain sand units representing channel, tidal and shoreface environment. Thicknesses up to 30 m are present, and it shifts laterally between fine to medium-grained channel sands and fine-grained shallow marine sandstones. Thin coal layers, some with rootlets, are developed in the eastern sections, and channel sands are present more frequently. This occurrence of such sandstone bodies makes De Geerdalen Formation promising as a reservoir for future CO_2 storage.

References:

Mørk, A., Knarud, R. & Worsley, D. 1982: Depositional and diagenetic environments of the Triassic and Lower Jurassic succession of Svalbard. In: Embry, A.F. & Balkwill, H.R. (eds.), *Arctic Geology and Geophysics, Canadian Society of Petroleum Geologists Memoir 8*, 371-398.

Riis, F., Lundschien, B.A., Høy, T. Mørk, A. & Mørk, M.B. 2008. Evolution of the Triassic shelf in the northern Barents Sea region. *Polar Research 27,* 318-338.

Sedimentary record of Baltic Ice Lake / Yoldia Sea transition in southern Finland

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During the Late Weichselian deglaciation a proglacial meltwater body, the Baltic Ice Lake (BIL), developed gradually in front of the Scandinavian Ice Sheet (SIS). Long and continuous series of varved clays were deposited in the basin. The deposition was interrupted with one unique event: at the end of Younger Dryas, the water level of BIL was lowered approximately 25 meters as the connection to ocean in central Sweden opened. This interruption of normal sedimentation can be traced from records as a special drainage horizon, which in southern Finland has found to make up a 10 cm thick layer, separating the diatactic "fresh water" clays from the symmict "brackish water" varves above. This so called "catastrophe varve" has been taken to mark the zero year in Swedish and also Finnish varve chronologies. Details of the BIL drainage event has been much discussed. However, a detailed sedimentological description of the transition zone in Finland is missing.

In the present study, three clay pits in southern Finland, south of Salpausselkä I, were examined. One of the studied pits, a section in Jokela, Tuusula, is the classical site for Finnish clay varve chronologies, having been described previously by Sauramo (1923), Niemelä (1971) and Donner (1995). Sections were