

5th INTERNATIONAL DYKE CONFERENCE, ROVANEIMI, FINLAND

The International Dyke Conference (popularly known as IDC) is the biggest gathering of dyke researchers and is held at every five years since 1985. The fifth IDC was held in Rovaneimi, Finland between 31st July and 3rd August 2005. Dr. Jouni Vuollo from the Geological Survey of Finland was the chief Convener. Lauri Pesonen, Professor of Geology, University of Helsinki formally inaugurated the Conference on the 1st August 2005. He was also Chairperson of the first and second sessions.

More than fifty delegates from all over the world participated in the conference which was organized in ten sessions. The very first session was devoted to GIS databases. Richard Ernst, Leader of Global Large Igneous Province (LIP) Atlas Project, provided comprehensive database on the dyke swarms of the globe. Second talk in this session was presented by Jouni Vuollo. He provided very detailed database on the Fennoscandian dyke swarms. There was only one paper in the second session (Dyke swarms of planetary bodies) which was delivered by James Head, Professor from Brown University. In his talk he provided information on the dykes from the Moon, Mars, Venus, and Mercury. He pointed out that there is ample evidence for the formation of extensive dyke swarms in different planetary bodies. Next session was devoted to the dyke swarms and assembly of continents. Four papers were included in this session; first one was the keynote address by W. Bleeker of the Geological Survey of Canada. In his talk he strongly stressed on the precise dating (<1 Ma precision) of very short-lived mafic magmatic events, which has paved the way in reconstructing ancient paleogeographies. Sten-Åke Elming presented palaeomagnetic and ³⁹Ar/⁴⁰Ar studies on the basic dykes from the central and northern Sweden. On the basis of these data he has established a clockwise rotation of Fennoscandia between 1.25 and 1.1 Ga. Next paper was on the 1.1 Ga old paleomagnetic, petrographical and paleointensity results on the diabases from the central Arizona by F. Donadini. These results documented the presence of two polarities in Arizona and suggest that there is a strong reversal asymmetry also present in Arizona, similar to Keweenaw. J. M. Coutinho presented petrological, chemical and geochronological data on the dyke swarms of the Parana plume-generated triple junction.

The next session was entirely devoted to geophysics of dykes and included nine papers. This session started with a keynote address by Henry Halls on the dyke swarms and continental deformation. In his talk he emphasized that

Proterozoic dyke swarms which cut Archaean shield areas of the world are well known as structural markers and these can be used to highlight deformation of the shield in the vicinity of major fault zones. He also explained how clouding in feldspars is important to estimate depth of dyke emplacement. The correlation of dyke swarms on a more global scale is a potentially powerful tool to reconstruct past configurations of continents. In an interesting presentation Jean-Pierre Lefort discussed how anisotropy of magnetic susceptibility (AMS) data on the mafic dyke swarms helps to recognize the azimuth and the dip of subduction. Karsten Obst from Germany presented AMS data on the plume head associated Permo-Carboniferous dolerite dykes from Sweden and suggested that regional variations within the dyke swarms exist. With the help of such studies one can understand the flow directions in a dyke. The next talk in this session was by Ram Weinberger. He presented AMS data on the earthquake-induced clastic dykes. Clastic dykes are formed either by passive deposition of clastic material into pre-existing fissures or by fracturing and injection of clastics during seismic shaking. With the help of AMS data on such clastic dykes, one can distinguish passively filled dykes from earthquake-induced injection dykes with the latter showing 'seismites'. The next three papers were devoted to paleomagnetic studies. Sten-Åke Elming presented data on the Mesoproterozoic basic dykes from the Ukrainian Shield, S. Mertanen presented data on the Paleo- and Mesoproterozoic dyke swarms from the Lake Ladoga area of NW Russia, and J. Salminen presented data on the Valaam sill of Lake Ladoga. All these papers suggest how paleomagnetic data on the dykes are helpful to understand reconstruction of past configurations of continents. J. V. Korhonen studied a dyke which was not exposed at the surface but identified by magnetic and gravity anomalies. Two core samples have been studied by him. These samples consist of several phases with different petrophysical characteristics, suggesting several intrusion phases. Vladimir Lyakhovsky explained that how seismological data support the interpretation that deflation of volcanoes is associated with lateral migration of magma from the caldera region and formation of dykes.

Second day's session started with papers related to isotopic studies on the dykes. The first paper was a keynote address by P. Jonathan Patchett. He presented chemical and isotopic data on the Precambrian mafic dykes and discussed its importance with reference to lithospheric and asthenospheric mantles. With the help of certain trace

elements and radio isotopes he emphasized that Precambrian dykes/sills can be used only in rare cases to infer mantle sources and their significance in continental tectonics and crust-lithosphere-asthenosphere relationships. H. Huhma presented Sm-Nd isotopic data on the Paleoproterozoic mafic dykes of Finland. These isotopic data revealed that rifting of the Archaean lithosphere took place at several stages. E. Hanski used SIMS, ID-TIMS and Sm-Nd isotopic methods and electron microprobe to study differentiated mafic intrusions from the northern and eastern Finland and suggested 2210-2220 Ma ages for these intrusions. Ulf Söderlund presented baddeleyite U-Pb dates for the Mesoproterozoic and Neoproterozoic mafic intrusions in the Baltic Shield. He reported six generations of dolerites emplaced between 950 Ma and 1600 Ma. U-Pb zircon/baddeleyite dates (~1260 Ma and ~950 Ma) are also presented for magmatic rocks from the southwestern Finland and central Sweden by O.T. Rämö. Nd isotope and geochemical data on the Kopparnäs basalt dyke, presented by Arto Luttinen, reveals a hotspot source for the 1.64 Ga bimodal rapakivi. Olav Eklund presented geochemical and Nd isotope data on the bimodal high-alumina basalt and A-type granite dykes from the SW Finland and suggested that their relation by the magmatic differentiation. The last paper of this session was presented by P. Peng. He presented geochemical and geochronological data on the 1.8 Ga old mafic dyke swarms from the central North China craton. He suggested that these dykes are generated through plume magmatism and contributed to the break-up of the NCC from Columbia supercontinent at 1.8 Ga.

Five papers were presented in the petrology and geochemistry session. The first paper was presented by David Evans on the Neoproterozoic mafic/ultramafic rocks and associated Ni deposits from the Eastern Africa. He suggested that these rocks are products of differentiation of a tholeiitic parental magma. Charles Maurice suggested that the secular evolution from Zr-poor to variably Zr-enriched tholeiitic magmas in the dykes of the Ungava Peninsula of the Northeastern Superior Province is due to the increasing incorporation of an enriched lithospheric mantle component with time. W. Teixeira noted asthenospheric signatures in the Mesoproterozoic mantle below the SW Amazonian craton, Brazil. The inference was drawn on the basis of geochemical and Nd-Sr compositions of the mafic dykes. De Oliveira Chaves explained that Zr/Y ratios of different mafic dyke swarms can help to identify mantle source. For this he studied mafic dyke swarms from the southern São Francisco craton, Brazil. Alvar Soesoo presented data on the Mesozoic mafic dykes exposed in the eastern Victoria, Australia. He suggested that these dykes are possibly markers of the early

stages of Gondwana break-up. This session also included two more papers, one on the lamprophyres and another on the ophiolites. A. Shebanov presented geochemical characteristics of the lamprophyre dyke swarm from the north Ladoga and eastern Finland region and suggested their genesis from an enriched mantle source, formed at ca. 1.8 Ga. S. Alaabed discussed the mantle sequence of the Semail ophiolite that represents oceanic upper mantle tectonic peridotites and various types of intrusions. This was the last presentation of second day.

The third and last day of this conference was exclusively preset for the presentations focused on the regional studies including Antarctica. De Oliveira Chaves presented geochemical, geochronological and magnetometric data on the mafic dyke swarms from the southeastern Brazil. These data suggest that this region comprises eight mafic dyke swarms (2.65 Ga to 0.05 Ga). On the basis of paleomagnetic data on dykes E. J. Piispa suggested Antarctica-Kalahari reconstruction at 180 Ma. Rajesh K. Srivastava, the only representative from India, presented detailed petrological and geochemical data on the diverse Precambrian mafic dyke swarms from the Central Indian Bastar craton and recognized three distinct swarms including a Neoproterozoic norite-boninite dyke swarm. He suggested a heterogeneous mantle source responsible for these swarms. M.B. Klausen presented data on the dyke swarms in the eastern Tibetan Plateau of China. On the basis of his data he argued that rigorous reconstruction will serve to elucidate the original dyke swarm geometry that will help to examine its relationship to the Emeishan LIP. Next three papers, focused on the Antarctica dykes were presented by Philip Leat and his co-workers (T.R. Riley and M.L. Curtis). Curtis studied mafic dykes (mainly dolerites) from the Dronning Maud Land, Antarctica and presented AMS data on these dykes. He found that 42% of AMS fabric is normal, 17% inverse and 8% intermediate, while others display no clear fabric relationship to the dyke walls. On the basis of these data he identified lateral flow in the ENE-WSW trending dykes and suggested that these dykes may have been sourced from a separate centre. Ilona Romu presented preliminary, mainly petrological data on the 159 Ma old lamproite dykes reported from the East Antarctica. Besides these oral presentations, more than ten papers, mainly based on the regional studies, were presented in the form of posters.

During the final session, the convener of the 5th IDC, Dr. Jouni Vuollo thanked everyone who helped in the organization of this conference. At the end Vuollo asked the audience about the next meeting of dyke conference with three words: Who? Where? When? As decided earlier, Dr. Rajesh K. Srivastava presented detailed plan for holding

next (i.e. Sixth) International Dyke Conference in India in 2010. He also informed the participants that 6th International Dyke Conference is likely to be co-sponsored by the Geological Society of India, Bangalore as a part of its Golden Jubilee Celebrations. Many distinguished dyke researchers including Henry Halls, Richard Ernst, Jouni Vuollo and W. Teixeira, strongly supported this proposal. Finally it was decided that the 6th IDC will be held in India in 2010 under the convenership of Rajesh K. Srivastava.

The conference ended with a line of resolution "*Good Bye! We will meet in India in 2010*". The official e-mail address of 6th IDC is "idcindia2010@yahoo.co.in".

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INTERNATIONAL SYMPOSIUM ON THE CRETACEOUS, NEUCHÂTEL, SWITZERLAND

The 7th International symposium on the Cretaceous was held in Neuchâtel, Switzerland during 5 - 9 September 2005. The Institute of Geology, University of Neuchâtel organised this symposium with the assistance of Swiss National Science Foundation, Swiss Academy of Natural Sciences and the University of Neuchâtel.

The venue chosen to hold the Cretaceous symposium at the back drop of the Swiss Jura mountains at Neuchâtel was befitting one. It is no wonder that the meet has kindled the interest of many active Cretaceous researchers for participation. Two historical stratotypes i.e. Velanginian and Hauterivian are defined in the Swiss Jura mountains close to Neuchâtel. It seems the term Neocomian is itself originated from Neuchâtel, a Latin derivative of Neocomium. The Velanginian Stage was defined by Desor and Gresley (1853) to demarcate the lower part of Neocomian and the Hauterivian was proposed by Renevier (1874) for the upper part. Later Baumberger (1901) introduced the Berriasian Stage for the lower part of Velanginian as defined by Jaccard (1869). Thus the Lower Cretaceous Neocomian was divided into three independent stages.

In this symposium about 250 participants from 300 registrations from more than 40 countries participated. Large contingent of participants were from European countries besides representatives from USA, South America, Canada, Middle-East, Africa, Russia, China, Australia and India. Six delegates from India attended this symposium. This meet is being held regularly every 4 to 5 years. The last meet took place at Vienna. The present ISC7 at Neuchâtel was dedicated to the memory of Prof. Jürgen Remane (1934-2004) who was former Professor of Geology at the University of Neuchâtel and later served as Chief Editor 'ECLOGAE' the Journal of Swiss Geological Society till the very end of his life.

A well brought out 240 pages abstract volume containing more than 310 abstracts (some are extended ones) with author's index along with full mailing and email addresses, besides detailed programme of the symposium was presented to the delegates at the registration desk.

On the opening day Prof. Karl Föllmi the convenor of ICS7 made introductory remarks on this Symposium followed by Prof. Daniel Schultherss Vice Rector of the University of Neuchâtel, welcomed the delegates. Dr. Thierry Adatte, Co-convenor eulogised the wisdom of Late Prof. Jürgen Remane and dedicated the symposium in his honour.

The oral presentations were organised in three parallel sessions in adjacent buildings. In all 26 technical sessions spread over 5 days covering the domains of Palaeontology, Paleocology, Stratigraphy (Cyclo-Chrono-Sequence), Sedimentology, Geochemistry (Stable Isotopes), Paleooceanography, Paleoclimatology, Volcanology, Tectonics, and Numerical Models were analysed. The diverse disciplines presented in parallel sessions enabled the participants to choose and participate in their field of interest. The time frame was meticulously followed as per the program schedule. A total of 126 papers were presented and discussed.

A keynote address devoted to a specific aspect of Cretaceous was delivered each day for an hour by an invited specialist. On the first day Elizabetta Erba, University of Milano, Italy in her address dealt on the evolution of Calcareous phytoplankton, anoxia, pCO₂ climatic change and igneous activities during the Cretaceous. She pointed out the calcareous nano plankton evolution, biocalcification and bio-diversity are caused by combination of many factors such as pCO₂ chemistry, structure and fertility of the ocean while climate and sea-level changes are of secondary causative factors.