

TALDICE

T A L O S D O M E I C E C O R E

EPICA

European
Project for
Ice Coring
in Antarctica

SCIENCE MEETING

ROME | ITALY APRIL 12 | 15_2010

NATIONAL RESEARCH COUNCIL HEADQUARTERS
P.LE ALDO MORO, 7

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Consorzio per l'attuazione del
Programma Nazionale di Ricerche in Antartide
PNRA S.c.r.l. (ENEA, CNR, OGS, INGV)

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SCIENCE MEETING

MONDAY APRIL 12, 2010

- 13:00-14:00 **Registration**
- 14:00-14:30 **Welcome and introduction**
G. Cavarretta, CNR - Department of Earth and Environment
C.A. Ricci, PNRA - Italian Scientific Antarctic Commission
- SESSION 1**
Session Chair **TALDICE SCIENCE Meeting**
J. Chappellaz, CNRS - LGGE (Grenoble)
- 14:30-15:00 *Status of isotopic measurements.* Stenni B.
- 15:00-15:20 *Comparison of the present and last interglacial as recorded in $\delta^{18}O$ from five Antarctic ice cores.* Masson-Delmotte V. et al.
- 15:20-15:40 *A 50,000-year climatic record from the new coastal TALDICE ice core: consequences on millennial-scale variability features through the Antarctic continent.*
Buiron D., Stenni B., Frezzotti M., Chappellaz J., Landais A., Masson-Delmotte V., Schilt A. and the Taldice Consortium
- 15:40-16:00 *Discussion*
- 16:00-16:30 **Coffee break**
- 16:30-16:50 *Up-date of chemistry consortium activity: situation and perspective.*
Udisti R. on behalf of TALDICE chemistry Consortium
- 16:50-17:10 *Preliminary results on chemical stratigraphies over the last glacial cycle from TALDICE ice core.*
Severi M., Becagli B., De Angelis M., Mulvaney R., Traversi R., Wegner A., Udisti R.
- 17:10-17:40 *Talos Dome Trace Elements Update.*
Vallelonga P., Gaspari V., Buretta C., Cozzi G., Gabrieli J., Spolaor A., Barbante C., Boutron C.F., Cescon P.
- 17:40-18:00 *Discussion*
- 18:00 **End of session**

TUESDAY APRIL 13, 2010

SCIENCE MEETING

SESSION 2

Session Chair

TALDICE SCIENCE Meeting

M. Frezzotti, ENEA (Rome)

9:00-9:20

Gas Consortium report. Stocker T.

9:20-9:40

New insights from CO₂ measurements from Talos Dome and EDML ice cores during MIS 3. Bereiter B., Luthi D., Siegrist M., Winkler R., Stocker T., Fischer H.

9:40-10:00

Atmospheric nitrous oxide during the last 140,000 years.

Schilt A., Baumgartner M., Schwander J., Buiron D., Chappellaz J., Loulergue L., Schupbach S., Spani R., Fischer H., Stocker T.

10:00-10:20

Discussion

10:20-10:40

Physical and electrical properties Consortium report. Kipfstuhl S.

10:40-11:00

Discussion

11:00-11:30

Coffee break

11:30-11:55

Aeolian dust research on the TALDICE core: state-of-art and perspectives for future.

Delmonte B., Petit J.R., Albani S., Baroni C., Mazzola C., Maggi V.

11:55-12:10

Tephra studies at TALDICE: current status and future prospects.

Narcisi B., Petit J.R., Chappellaz J., Buiron D.

12:10-12:30

Discussion

12:30-14:00

Light lunch

SESSION 3

Session Chair

TALDICE SCIENCE Meeting

T. Stocker, University of Bern

14:00-15:00

Poster Session

15:00-15:20

Beryllium 10 record over the last deglaciation from the Talos Dome ice core.

Radionuclides Consortium report: Baroni M., Bard E., Bourles D.

15:20-15:40

Ice flow/dating Consortium report. Ritz C., Buiron D., Lemieux-Dudon B.

15:40-16:00

Discussion

16:00-16:30

Coffee break

16:30-18:00

Open Discussion: Sample request, future measurements and publication strategy, next meeting.

Closing Remarks

18:00

End of session

18:30-20:00

EuroPICS Steering Committee

TALDICE: List of offered posters (posters should be vertical A0 portrait)

- *Changes in mineral dust transport and deposition to Antarctica between the Last Glacial Maximum and current climates: modelling concentration, size and provenance.* Albani S., Mahowald N., Delmonte B., Maggi V.
- *TALDICE CH₄ and N₂O records.* Baumgartner M., Schilt A., Buiron D., Fischer H., Stocker T.
- *Sulphur oxidised compounds TALDICE stratigraphy and marine biogenic activity over the last 150 kyr.* Becagli S., Severi M., Traversi R., De Angelis M., Mulvaney R., Wegner A., Udisti R.
- *Hydrogen isotopes preclude clathrate CH₄ emissions at the onset of Dansgaard-Oeschger events.* Bock M., Schmitt J., Behrens M., Muller H., Schneider R., Spani R., Blunier T., Fischer H.
- *Late-Holocene high-resolution $\delta^{18}O$ record from the TALDICE ice core.* Braida M., Stenni B., Selmo E., Bonazza M., Masson-Delmotte V., Dreossi G., Genoni L., Iacumin P., Buiron D.
- *Sources and transport of dust to Antarctica: results from The Talos Dome Ice.* Federer U. et al.
- *High-Resolution Dust record of last glacial period (MIS4 to MIS2) from Talos Dome Ice Core.* Mazzola C., Maggi V., Delmonte B., Marino F., Albani S.
- *Snow precipitation at Talos Dome core site in East Antarctica: provenance, seasonality and blocking factor.* Scarchilli C., Frezzotti M., Ruti P.
- *Stable isotope constraints on Holocene carbon cycle changes from an Antarctic ice core.* Schmitt J., Elsig J., Schneider R., Leuenberger D., Eyer M., Leuenberger M., Joos F., Stocker T., Fischer H.
- *Update on stratigraphic volcanic link between TALDICE and EDC ice cores.* Severi M., Becagli S., Manganeli D., Traversi R., Udisti R.
- *Continuous high-resolution dust size distribution measurements in the EPICA-DML ice core.* Wegner A., Fischer H., Ruth U., Kaufmann P.
- *Spatial (data and model) and temporal variability of ¹⁷O-excess in East Antarctica.* Winkler R., Landais A., Uemura R., Xiao C., Hoffmann G., Jouzel J., Kelley M., Fukui K.

Poster sessions are over lunch times – they will be up at all times, presenters are encouraged to be with their poster for the second half of the lunch time slot.

SCIENCE MEETING

WEDNESDAY APRIL 14, 2010

SESSION 1

Session Chair

EPICA SCIENCE Meeting

E. Wolff, BAS (Cambridge)

9:00-9:15

Introduction to the meeting: EPICA in 2010. Wolff E.

Consortium reports – overviews of recent progress (since 2008) and plans:

9:15-9:30

Isotopes, Jouzel J.

9:30-9:45

Chemistry, Wolff E.

9:45-10:00

Gases, Fischer H.

10:00-10:15

Dust, Petit J.R.

10:15-10:30

Physical properties, Kipfstuhl S.

10:30-10:45

Discussion of other issues (borehole measurements, modelling,...)

10:45-11:15

Coffee break

11:15-12:35

Chair, H. Fischer

11:15-11:35

Comparison of the present and last interglacial as recorded in $\delta^{18}O$ from five Antarctic ice cores. Masson- Delmotte V. et al.

11:35-11:55

A consistent view on temperature, sea level, CO_2 and marine $\delta^{18}O$ records over the last 20 Myrs. Van de Wal R., de Boer B., Lourens L., Bintanja R.

11:55-12:15

The reconstructed ice core - first measurements of 3d structure properties in representative volumes using a X-ray computer tomograph especially designed for ice cores. Freitag J., Kipfstuhl S., Hörhold M., Salamon M., Volland V.

12:15-12:35

The consequences of the age distribution of gases entrapped in ice cores for rapid changes in CO_2 and CH_4 synchronisation. Köhler P., Knorr G., Buiron D., Laurantou A., Chappellaz J.

12:35-14:00

Light lunch

WEDNESDAY APRIL 14, 2010

SCIENCE MEETING

SESSION 2

Session Chair

EPICA SCIENCE Meeting

C. Barbante, CNR - University of Venice

14:00-14:20

Stable isotope constraints on Holocene carbon cycle changes from an Antarctic ice core. Schmitt J., Elsig J., Schneider R., Leuenberger D., Eyer M., Leuenberger M., Joos F., Stocker T., Fischer H.

14:20-14:40

Innovative methodology to measure at high-depth resolution and high accuracy the CH₄ and N₂O mixing ratio along ice cores. Chappellaz J., Romanini D., Pascual O.

14:40-15:00

IPCC Working Group 1 of AR5; how it will work and how individual scientists can contribute. Stocker T.

15:00-16:10

Poster session including coffee break

16:10-18:00

Dating session

16:10-16:30

Toward a Radiometric Ice Clock: U-series Ages of the Dome C Ice Core. Aciego S., Bourdon B., Schwander J., Baur H., Forieri A.

16:30-16:50

Use of paleomagnetic intensity to synchronize EPICA Dome C with marine sediments. Raisbeck G.

16:50-17:10

Bayesian method for consistent dating of Antarctic and Greenland ice cores. Lemieux-Dudon B., Petit J.R., Capron E., Blayo E., Landais A., Waelbroeck C., Ritz C., Svensson A., Barnola J.M., Narcisi B., Parrenin F.

17:10-18:00

Discussion: Should we adopt an EDC4 (and EDML2) age scale or should we wait? (discussion to be led by Wolff E., Fischer H., Lemieux-Dudon B.; see notes EDC4 - and EDML2 - age scale, pag. 8)

18:00

End of session

20:00

Meeting Dinner at "Efeso il Barrocciaio" - Via dei Salentini, 12 (Roma)

SCIENCE MEETING

THURSDAY APRIL 15, 2010

SESSION 3

Session Chair

EPICA SCIENCE Meeting

V. Masson-Delmotte, LCSE (Paris)

- 9:00- 9:10 *Reflections on dating issue – next steps (if any)*
- 9:10- 9:30 *Hydrogen isotopes preclude clathrate CH₄ emissions at the onset of Dansgaard-Oeschger events. Bock M., Schmitt J., Möller L., Spahni R., Blunier T., Fischer H.*
- 9:30- 9:50 *New insights from CO₂ measurements from Talos Dome and EDML ice cores during MIS. Bereiter B., Lüthi D., Siegrist M., Winkler R., Stocker T., Fischer H.*
- 9:50-10:10 *Sub-millennial climate variability during past interglacial periods: insights from new high resolution deuterium measurements conducted on the EPICA Dome C ice core. Pol K., Masson-Delmotte V., Bigler M., Cattani O., Capron E., Debret M., Dreyfus G., Durand G., Falourd S., Johnsen S., Jouzel J., Landais A., Minster B., Parrenin F., Ritz C., Steen-Larsen H.C., Stenni B.*
- 10:10-10:30 *Simplest model giving a natural cause for diverse CO₂ trends during different interglacials. Wolff E., Fischer H., Lüthi D., Masson-Delmotte V.*
- 10:30–11:20 **Coffee break and further poster time**
- 11:20-12:30 *Chair: H. Miller, AWI (Bremerhaven)*
- 11:20-11:40 *Continuous high-resolution dust size distribution measurements in the EPICA-DML ice core. Wegner A., Fischer H., Ruth U., Kaufmann P.*
- 11:40-12:00 *High resolution record of isotopic composition of nitrogen in air trapped in the EDC ice core over termination 2 and MIS 5: study of the phase lag between CO₂ and temperature changes. Landais A., Capron E., Dreyfus G., Lourantou A., Luethi D., Bereiter B., Prié F., Bouygues A., Caillon N., Chappellaz J., Jouzel J., Leuenberger M., Masson-Delmotte V., Raynaud D.*
- 12:00-12:30 *The future of EPICA, of EPICA science meetings, and of European ice core science (EuroPICS): discussion led by Wolff E.*
- 12:30–14:00 **Light lunch**
- 14:00 **Meeting Adjourns**

EPICA: List of offered posters (posters should be vertical A0 portrait)

- *Oxygen isotopes of EPICA-Dome C extraterrestrial dust layers: constraints on the nature of the impactors.* Engrand C., Narcisi B., Petit J.R., Dobrica E., Duprat J.
- *Tephra studies at TALDICE: current status and future prospects.* Narcisi B., Petit J.R., Chappellaz J., Buiron D.
- *Millennial and sub-millennial scale climatic variations recorded in polar ice cores over the last glacial period.* Capron E., Landais A., Chappellaz J., Schilt A., Buiron D., Dahl-Jensen D., Johnsen S., Jouzel J., Lemieux-Dudon B., Loulergue L., Leuenberger M., Masson-Delmotte V., Meyer H., Oerter H., Stenni B.
- *Seasonal and spatial distribution of aerosols in the hinterland of the Neumayer station.* Schmidt K., Wegner A., Weller R., Twarloh B., Oerter H.
- *First results from chemical analyses of surface snow sampled along the entire JASE traverse route.* Karlin T., Hansson M.
- *Thallium as a Tracer for Preindustrial Volcanic Eruptions.* Kellerhals T., Tobler L., Sigl M., Wacker L., Gäggeler H.W., Schwikowski M.
- *Update of $\delta^{18}O$ and D data of the EDML core.* Oerter H., Meyer H.
- *Temperature profile in the Epica DC borehole.* Ritz C., Lefevbre E. and others.
- *Spatial (data and model) and temporal variability of ^{17}O -excess in East Antarctica.* Winkler R., Landais A., Uemura R., Xiao C., Hoffmann G., Jouzel J., Kelley M., Fukui K.
- *High resolution dust measurements on the NGRIP ice core – Holocene vs. Glacial Period.* Wolff K., Fisher H. and Ruth U.
- *Spatial and temporal snow grain size variability along the Japanese Swedish Antarctic Expedition 07/08 traverse route.* Ingvander S., Hansson M.
- *The last interglacial - constraints about the vegetation dynamics using ice core χ_{1000} data and the Bern CC+LPJ model.* Schneider R., Schmitt J., Joos F., Fischer H.
- *Glacial-interglacial and millennial-scale variations in the atmospheric nitrous oxide concentration during the last 800,000 years.* Schilt A., Baumgartner M., Blunier T., Schwander J., Spahni R., Fischer H., Stocker T.
- *Combining total air content measurements with ice and pore structure investigations on the micro-scale.* Behrens M., Kipfstuhl S., Oerter H., Freitag J.
- *Sources and transport of dust to Antarctica: results from The Talos Dome Ice.* Federer U. et al.

SCIENCE MEETING

Notes EDC4 (and EDML2) age scale

When we adopted the EDC3 and EDML1 age scales, we said that we should not adopt a new age scale until there were substantial improvements to be made. Bénédicte's method, described in the last talk, offers an improved way to use information from different sources to construct a better scale. In particular it would (to a large extent) solve the biggest problem with EDC3/EDML1, that they are inadequate for high resolution studies over MIS3-5, in part because the ice and gas scales are not consistent with each other.

This was the reason that the 2006 community paper also presents EDML on a GICC05 age scale. An age scale such as proposed would also put our scales automatically on the same scale as other cores (Vostok, NGRIP). On the other hand, we might also consider that a full set of O₂/N₂ data, that might become available soon from Dome Fuji even if elusive for Dome C, would offer a further improvement for the deeper parts of EDC, and that we should wait for that before taking the major step of endorsing a new age scale.

If we do go ahead, then considerable work will be needed to agree finally which age markers and scales should be included, and to ensure that the age scale is launched in a way that makes its relationship to EDC3/EDML1, and to external scales such as LR04, really clear; and to ensure that it is implemented in all the datasets we have already deposited at data centres. (Remember that, although Fred Parrenin made it his main job to lead its production, it still required an entire journal special issue to launch EDC3/EDML1, and took a team of around a dozen people more than a year to completely prepare). This discussion is intended as a first step to allow the EPICA SC to decide whether an EDC4/EDML2 effort should take place now, and if so, how it should be done.