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New $\delta^{18}\text{O}_{\text{atm}}$, $\delta^{18}\text{O}_{\text{ice}}$ and $\delta\text{D}_{\text{ice}}$ profiles from deep ice of the TALDICE core

#shareEGU20 - SESSION CL1.14/CR2.12

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*I. Crotti^{1,5}, C. Barbante^{1,2}, M. Frezzotti³, W. Jiang⁴, A. Landais⁵, Z.-T. Lu⁴, F. Ritterbusch⁴, B. Stenni^{1,2},
and G.-M. Yang⁴*

¹*Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice, Italy*

²*Institute for Polar Sciences (ISP), CNR, Venice, Italy*

³*Department of Science, Roma Tre University, Rome, Italy*

⁴*University of Science and Technology of China, Hefei, China*

⁵*Laboratoire des Sciences du Climat et de l'Environnement IPSL/CEA-CNRS-UVSQ UMR, Gif-sur-Yvette, France*



FROM THE DEEP - new HR $\delta^{18}\text{O}_{\text{atm}}$, $\delta^{18}\text{O}_{\text{ice}}$ and $\delta\text{D}_{\text{ice}}$ profiles

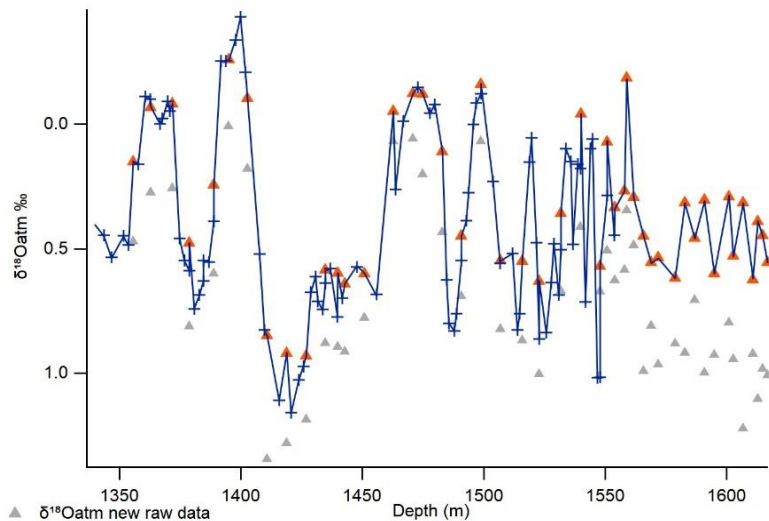
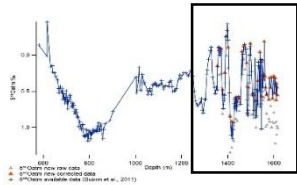
FACTS



- TALDICE is a 1620 m depth ice core from East Antarctica
- AICC 2012 official dating (Bazin et al. 2013) until 1548 m (~150 ky BP)
- Subglacial hill close to the core at 1550 m depth

New $\delta^{18}\text{O}_{\text{atm}}$ data

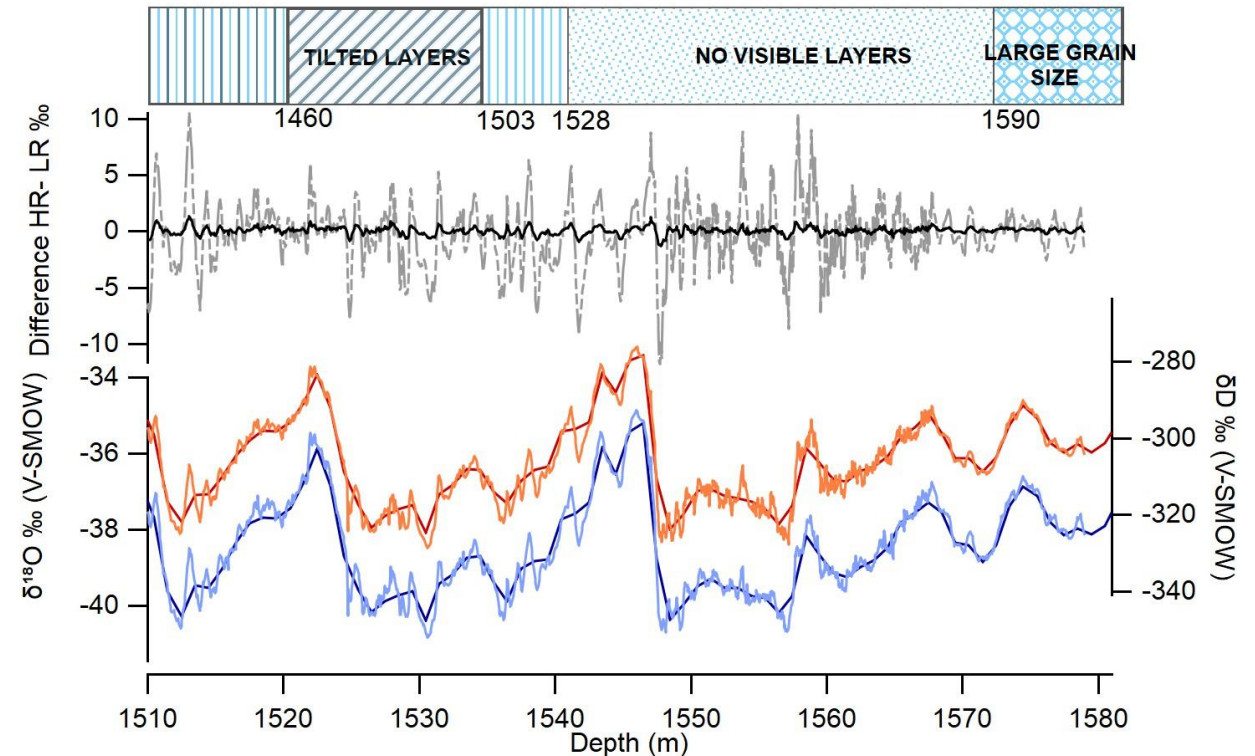
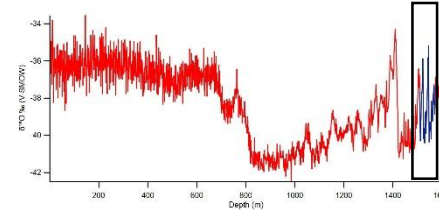
New 46 samples measured
1357 - 1617 m depth



▲ $\delta^{18}\text{O}_{\text{atm}}$ new raw data
 ▲ $\delta^{18}\text{O}_{\text{atm}}$ new corrected data
 + $\delta^{18}\text{O}_{\text{atm}}$ available data (Buiron et al., 2011)

New HR $\delta^{18}\text{O}_{\text{ice}}$ and δD data

New HR resolution (5 cm)
 $\delta^{18}\text{O}$ and δD measurements
1510-1579 m depth

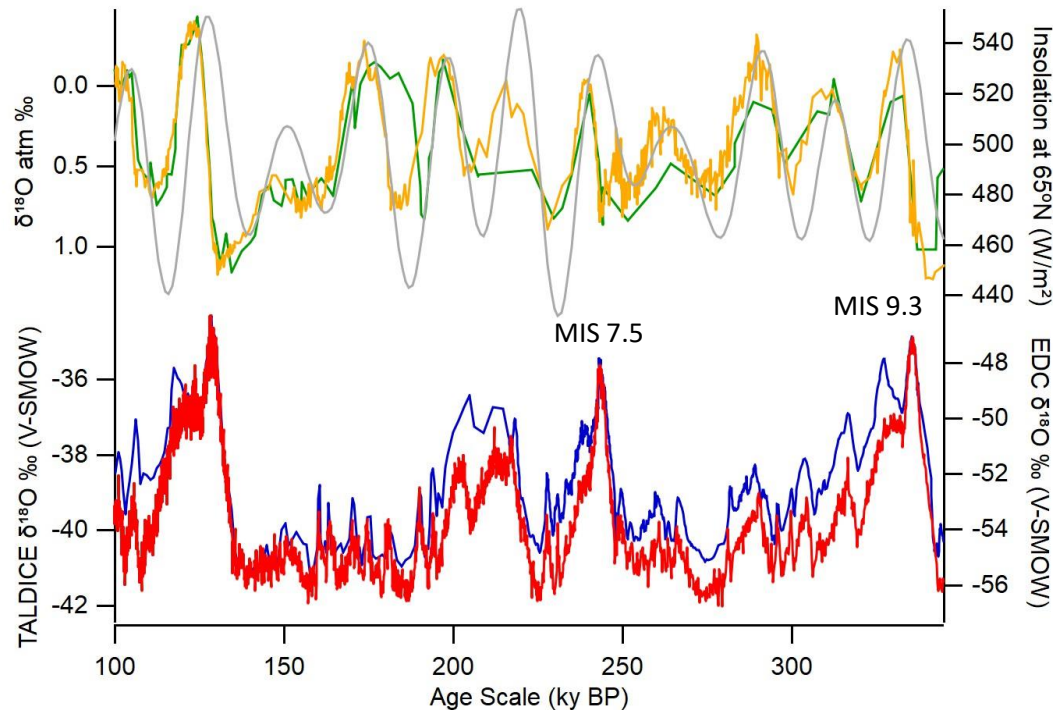


— $\delta^{18}\text{O}$ LR 1 m (Stenni et al., 2011)
 — $\delta^{18}\text{O}$ HR (5 cm)
 — $\delta^{18}\text{O}$ difference HR- LR
 — δD LR - 1 m (Stenni et al., 2011)
 — δD HR (5 cm)
 — δD difference HR- LR

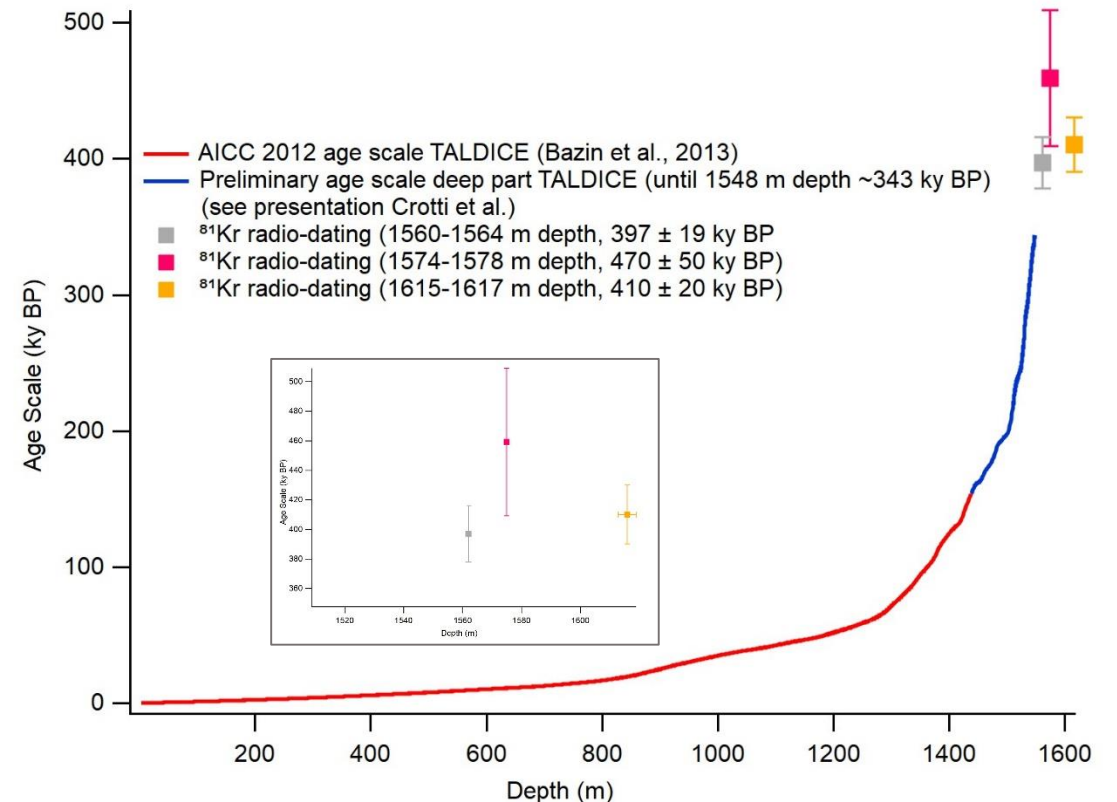
Towards a dating for TALDICE deep part?

- Preliminary dating obtained by the comparison between:
 1. TALDICE HR $\delta^{18}\text{O}$ record (5cm) and EPICA Dome C $\delta^{18}\text{O}$ record on the AICC 2012 Age Scale (Bazin et al., 2013)
 2. TALDICE new $\delta^{18}\text{O}_{\text{atm}}$ record with EPICA Dome C $\delta^{18}\text{O}_{\text{atm}}$ record on the AICC 2012 Age Scale (Exteir et al., 2018)

- The preliminary dating was obtained until the depth of 1548 m depth ~ 343 ky BP using both $\delta^{18}\text{O}$ and $\delta^{18}\text{O}_{\text{atm}}$
- Below this depth the climatic signal appears not being preserved
- ^{81}Kr radio-dating helps in dating the core below 1548 m (for details see the presentation by Ritterbusch et al.)



— TALDICE $\delta^{18}\text{O}_{\text{atm}}\text{‰}$ (Buiron et al., 2011 and new data) — EDC $\delta^{18}\text{O}_{\text{atm}}\text{‰}$ (Exteir et al., 2018)
— TALDICE $\delta^{18}\text{O}_{\text{ice}}\text{‰}$ (Bazin et al., 2013 and new data) — EDC $\delta^{18}\text{O}_{\text{ice}}\text{‰}$ (Bazin et al., 2013)
— Insolation 65°N (Laskar et al., 2004)



— AICC 2012 age scale TALDICE (Bazin et al., 2013)
— Preliminary age scale deep part TALDICE (until 1548 m depth ~ 343 ky BP) (see presentation Crotti et al.)
■ ^{81}Kr radio-dating (1560-1564 m depth, 397 ± 19 ky BP)
■ ^{81}Kr radio-dating (1574-1578 m depth, 470 ± 50 ky BP)
■ ^{81}Kr radio-dating (1615-1617 m depth, 410 ± 20 ky BP)



Conclusions and future perspectives

CONCLUSIONS

- New $\delta^{18}\text{O}_{\text{ice}}$ and $\delta\text{D}_{\text{ice}}$ high resolution data (5cm) helped in **extending back in time the climatic record until MIS 9.3** (343 ~ ky BP)
- New $\delta^{18}\text{O}_{\text{atm}}$ record seems also to be preserved up to 1548 m depth
- TALDICE core is characterized by **extreme thinning conditions between MIS 7.5 and 9.3**
- The **average resolution** is estimated equal to **1.38 ky/m** (0.069 ky/5cm) for **MIS 7.5** and **3.20 ky/m** (0.160 ky/5cm) for **MIS 9.3**
- **Below 1548 m the climatic record** seems **not** to be entirely **preserved** due to lack of stratigraphic order

FUTURE PERSPECTIVES

- **New $\delta^{18}\text{O}_{\text{atm}}$ measurements** will be performed to **improve the record resolution** and the determination of gas age