

<sup>14</sup>C DATING OF MOLECULAR BIOMARKERS

## RECENT DEVELOPMENTS AT LSCE AND APPLICATION TO ARCHAEOLOGICAL BUTTERS



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## Introduction

- Compound-specific <sup>14</sup>C dating
  - > Source control
  - > Reduction of contaminations

- Low amounts of C -> ECHo-MICADAS

- Applications : Archaeology, Carbon cycle, Palaeoenvironments, Environment, Forensics

- No standard

- Intercomparison exercise on standards

Lead by Bristol University



BRISTOL

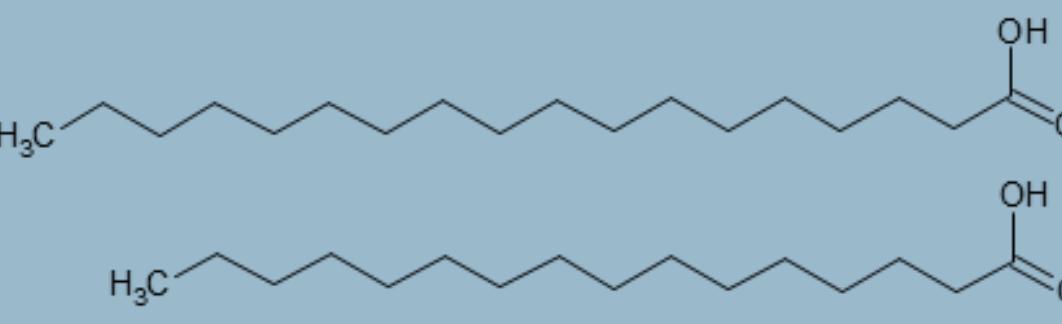
Bram's

## Materials

- Two archaeological butters preserved in Irish peats:
  - > IB33 :  $3777 \pm 4$  yrs BP
  - > IB38 :  $338 \pm 3$  yrs BP

museum  
National Museum of Ireland  
Ard-Mhúsaem na hÉireann

- A mix of these two butters in unknown proportions
- A present day butter
- Bulk and C<sub>16</sub> et C<sub>18</sub> fatty acids dating
- Only results for IB33 et IB38 are presented



## Methods

- Extraction/esterification
  - > Casanova et al. (2018)

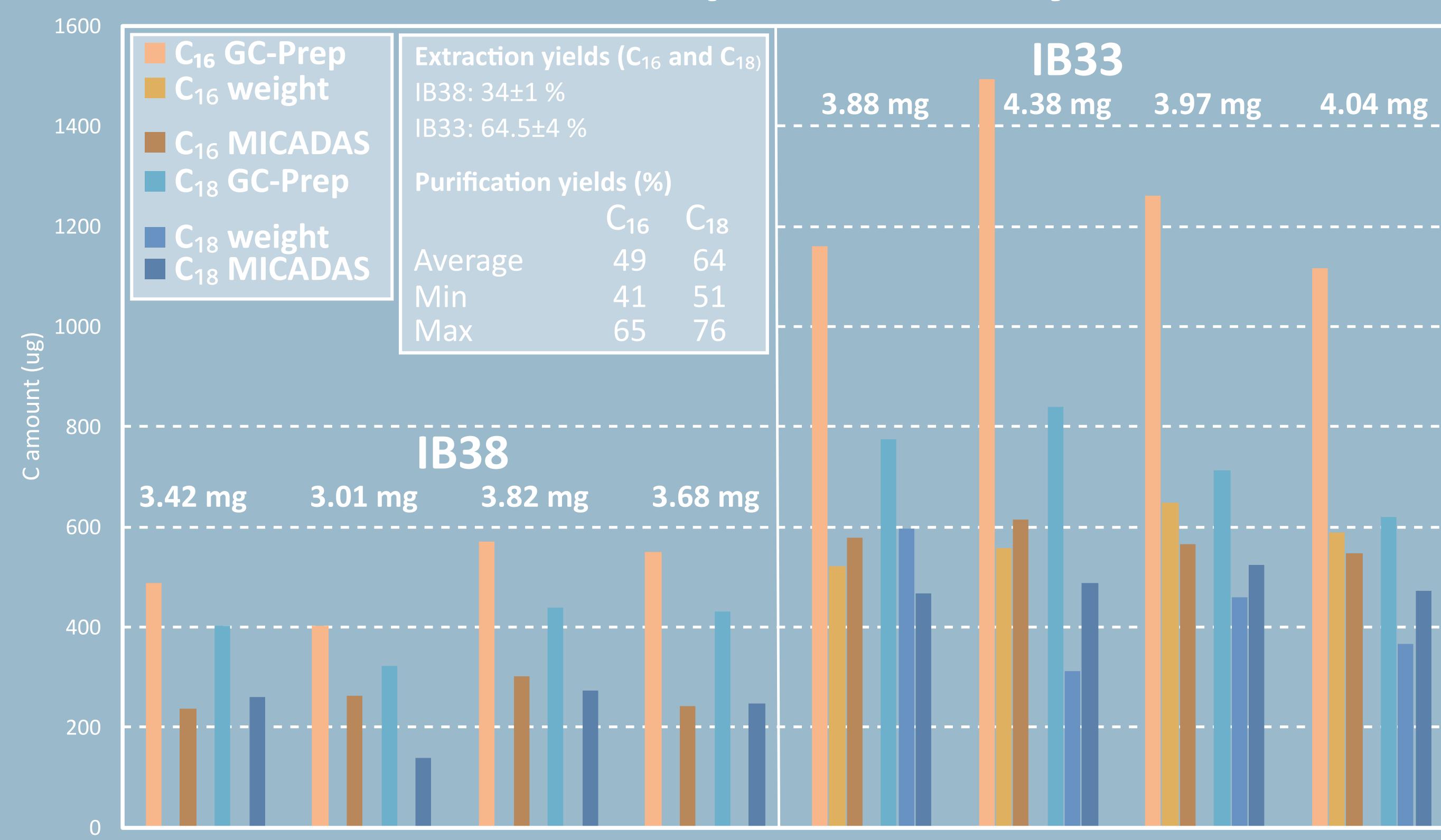
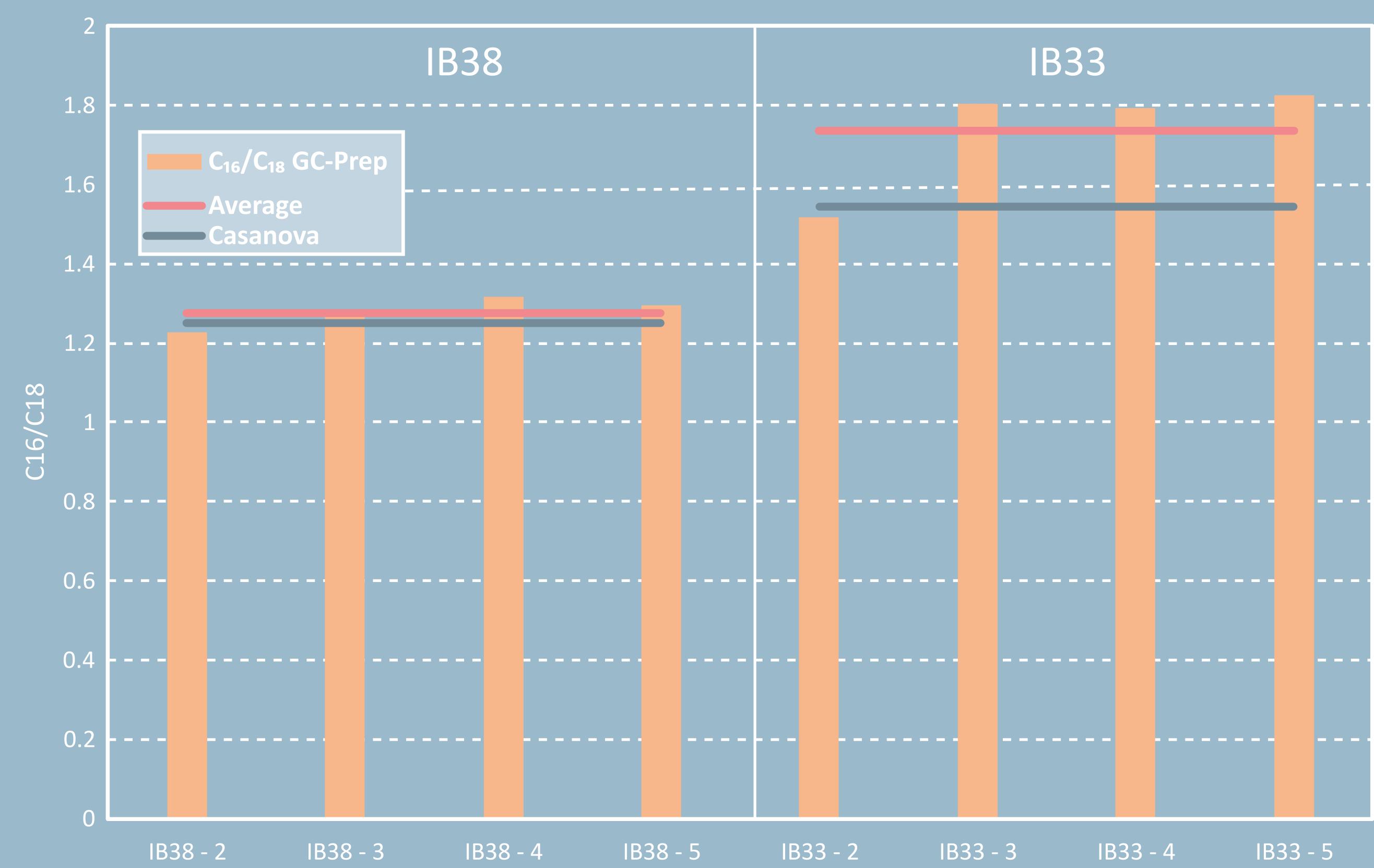
- Purification of C<sub>16</sub> and C<sub>18</sub>
  - > Casanova et al. (2018)

## Dating by ECHo-MICADAS

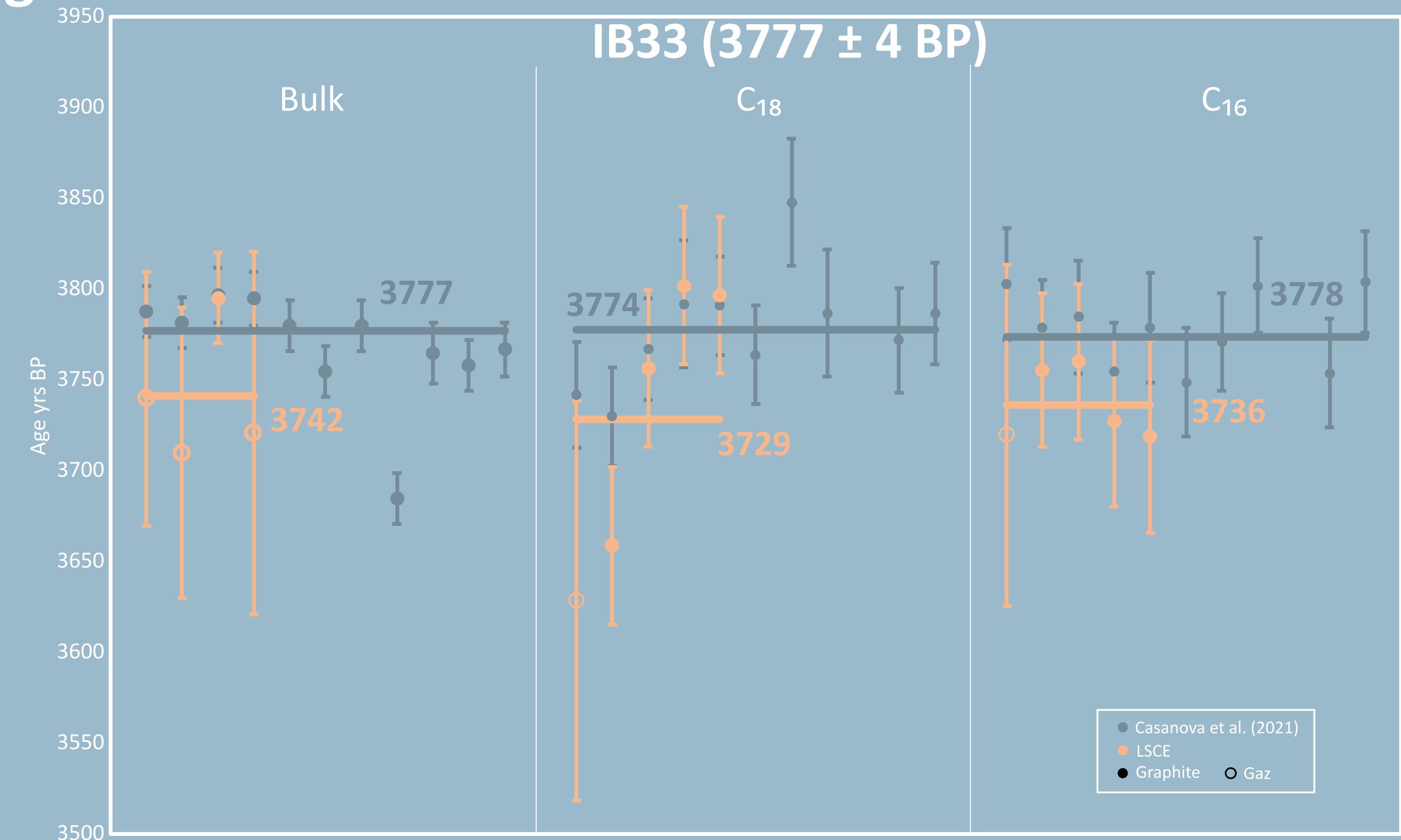
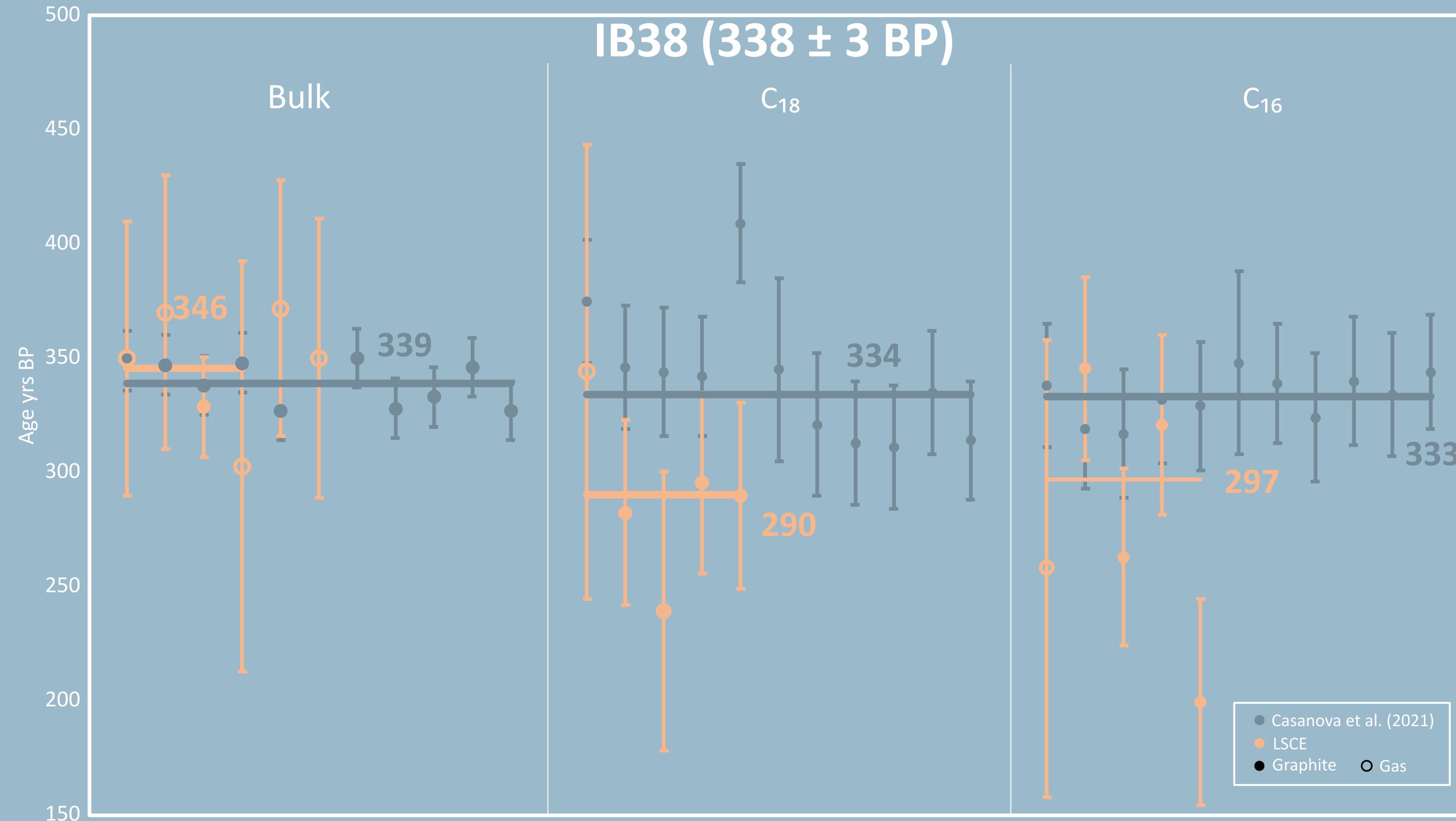
- C > 200 µg
  - > graphitization
- C < 200 µg
  - > gas source

## Results

## Extraction and purification yields

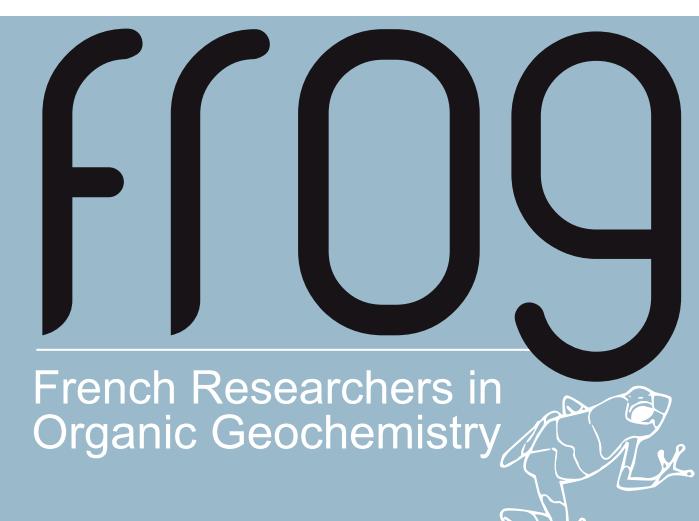
C<sub>16</sub>/C<sub>18</sub>

## Dating



## Conclusions

- Agreement with previous results (~40 yrs). C<sub>16</sub> and C<sub>18</sub> younger than Casanova et al. (2021)
- Current developments:
  - Improvement of purification yields (achieved - oncolumn injection)
  - Estimation of contamination (estimated at 3 µgC (C<sub>16</sub>) – 1 µgC (C<sub>18</sub>) by GC-prep)



Casanova et al. (2021). Generation of two new radiocarbon standards for compound-specific radiocarbon analyses of fatty acids from bog butter finds. Radiocarbon, doi:10.1017/RDC.2021.15

Casanova et al. (2018). Practical considerations in high-precision compound-specific radiocarbon analyses: eliminating the effects of solvent and sample cross-contamination on accuracy and precision. Anal. Chem. 90, 11025-11032.