Glacial exposure dating – a global compilation

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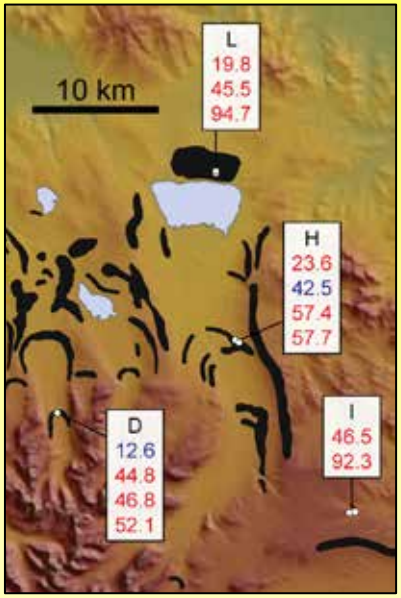
Outline

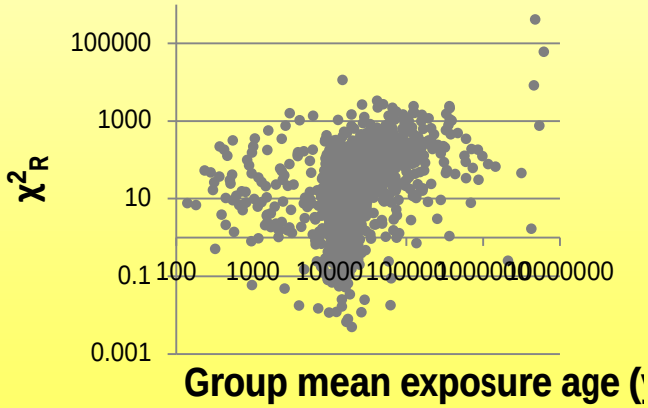
Background/obective

Exposure age compilation

Exposure age scatter

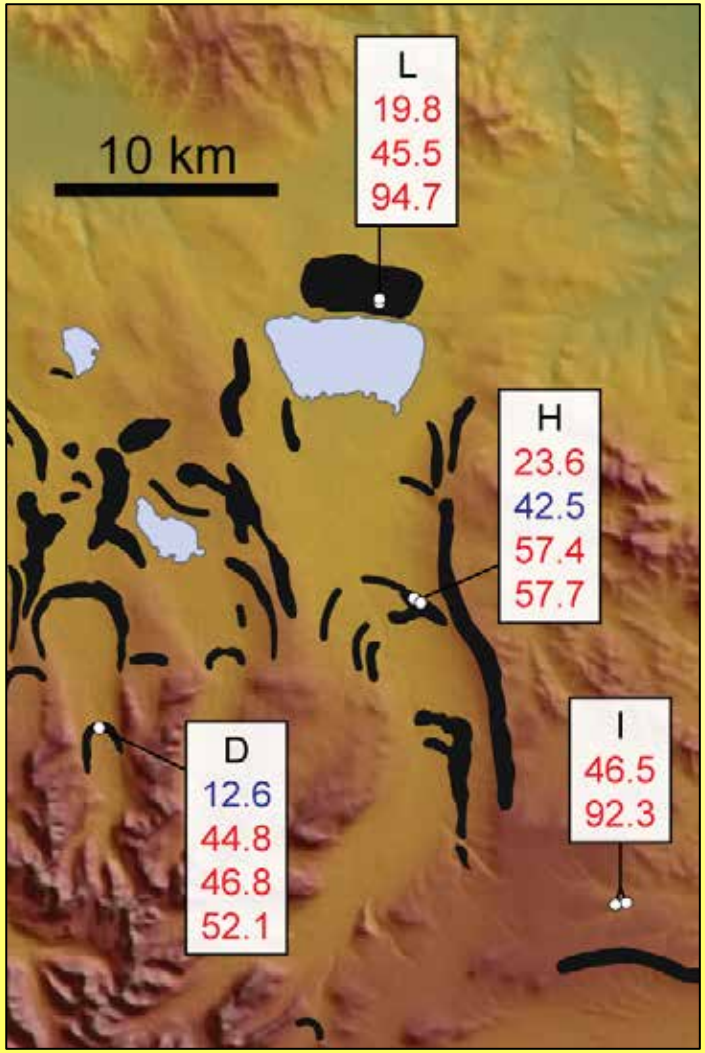
Good exposure ages

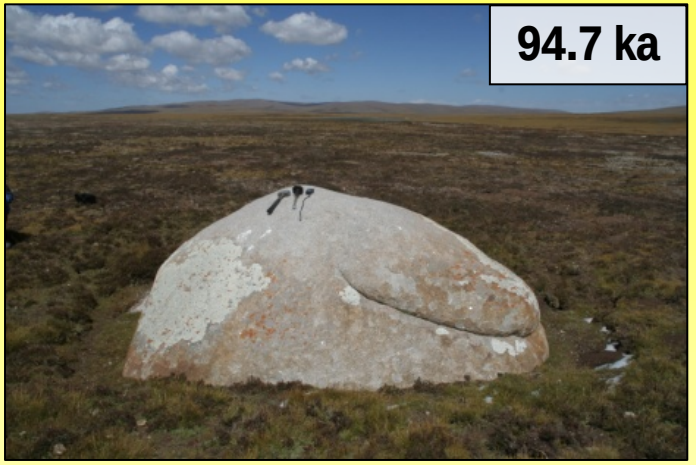


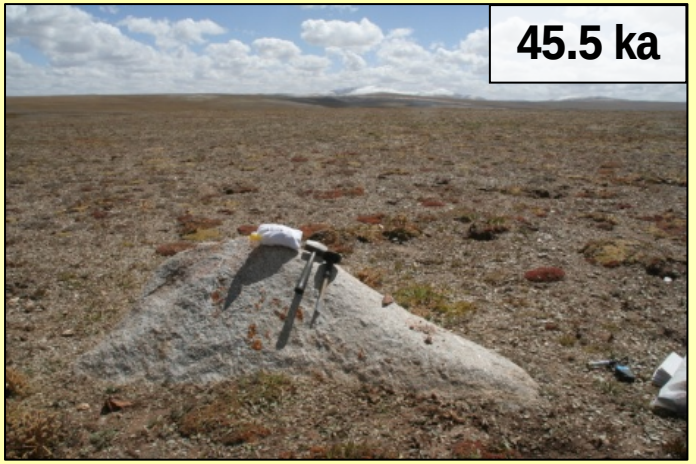


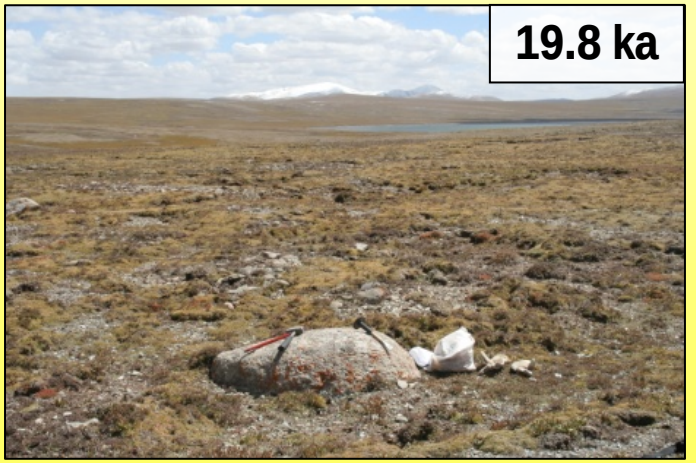
Background

Correct age ???









Objective

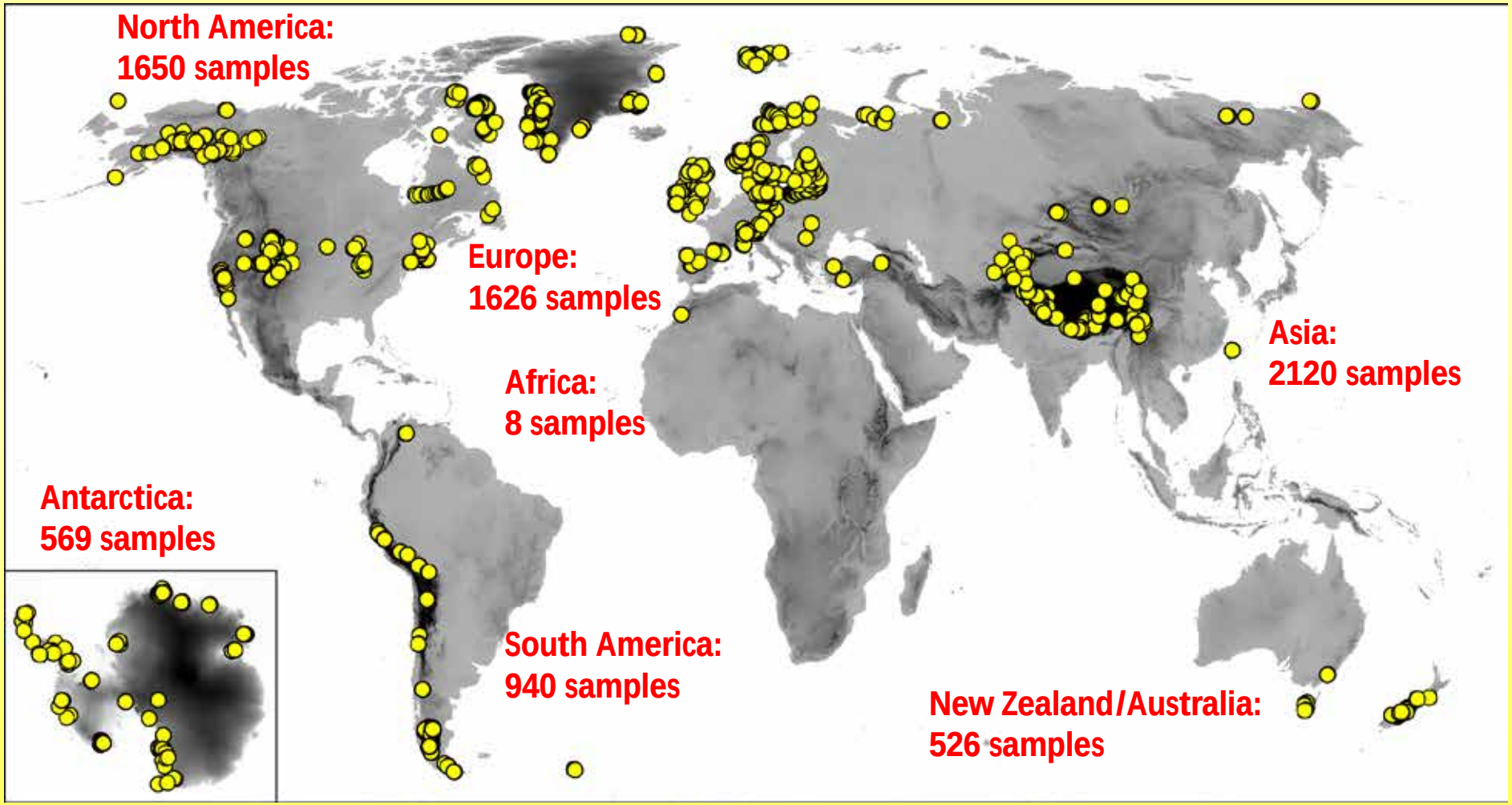
- How much scatter is there in the global dataset?

- What does the good (well-clustered) exposure ages tell us?

7882 ^{10}Be measurements (1175 ^{26}Al) from 7724 samples:

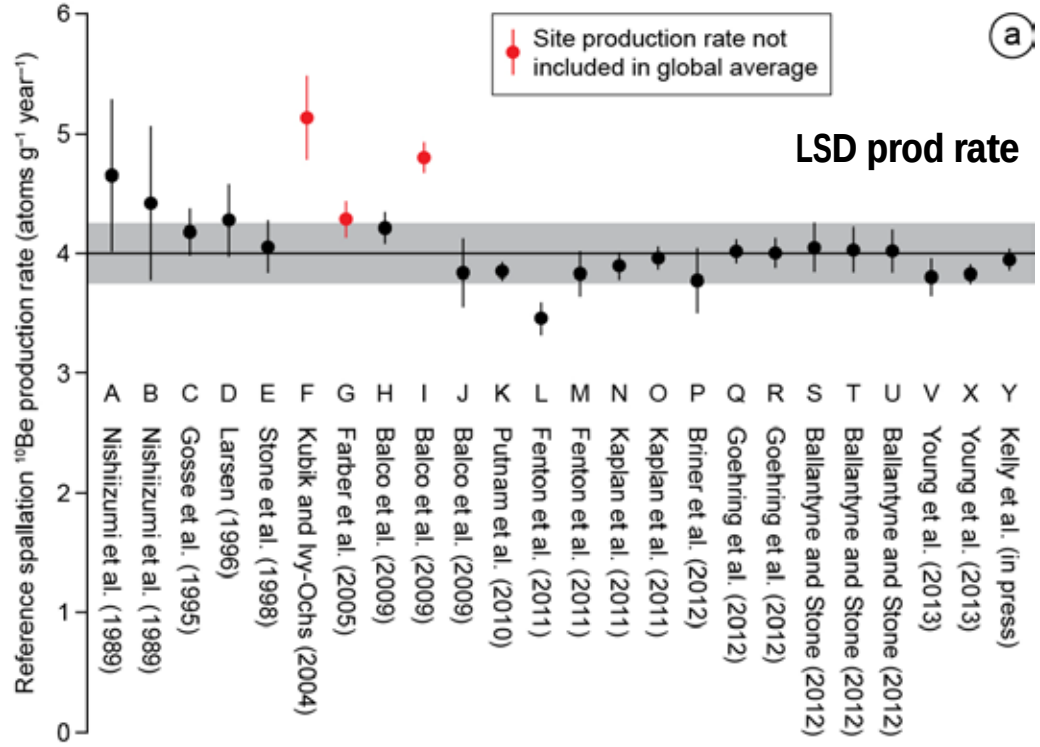
6091 boulder, 1240 bedrock, 589 clasts

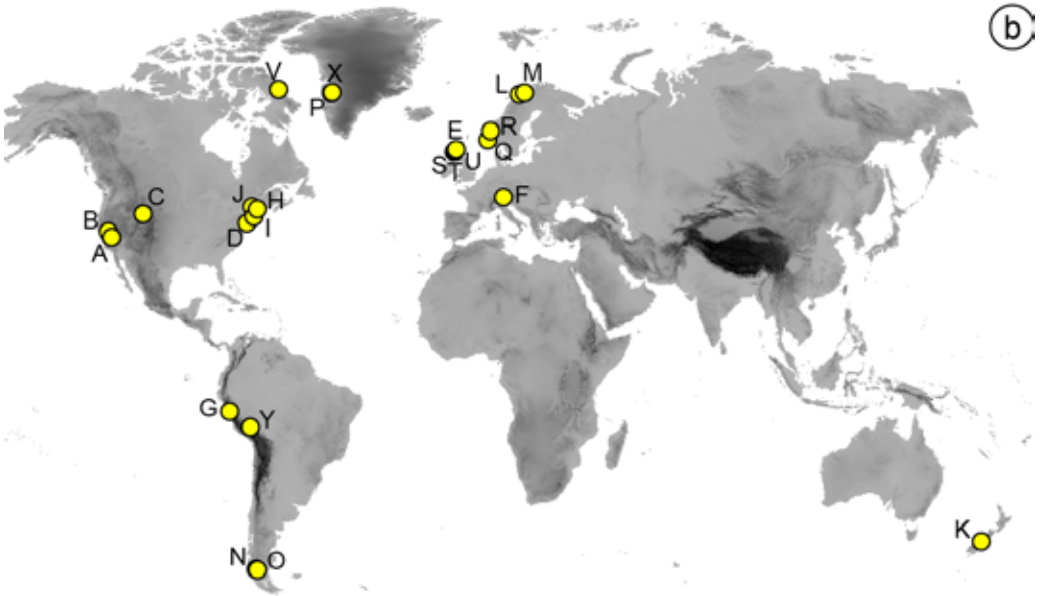
380 publications

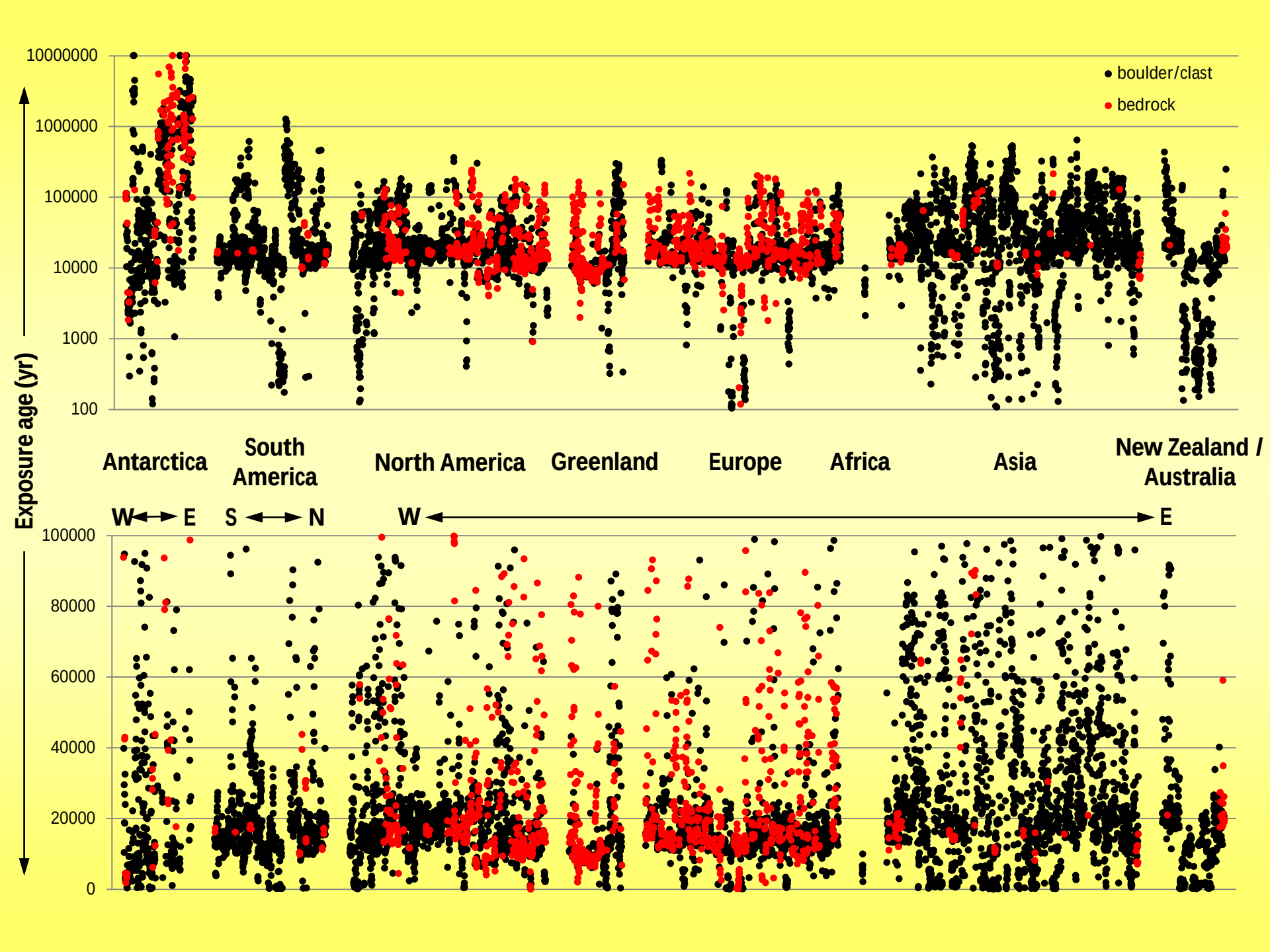


Exposure age calculation

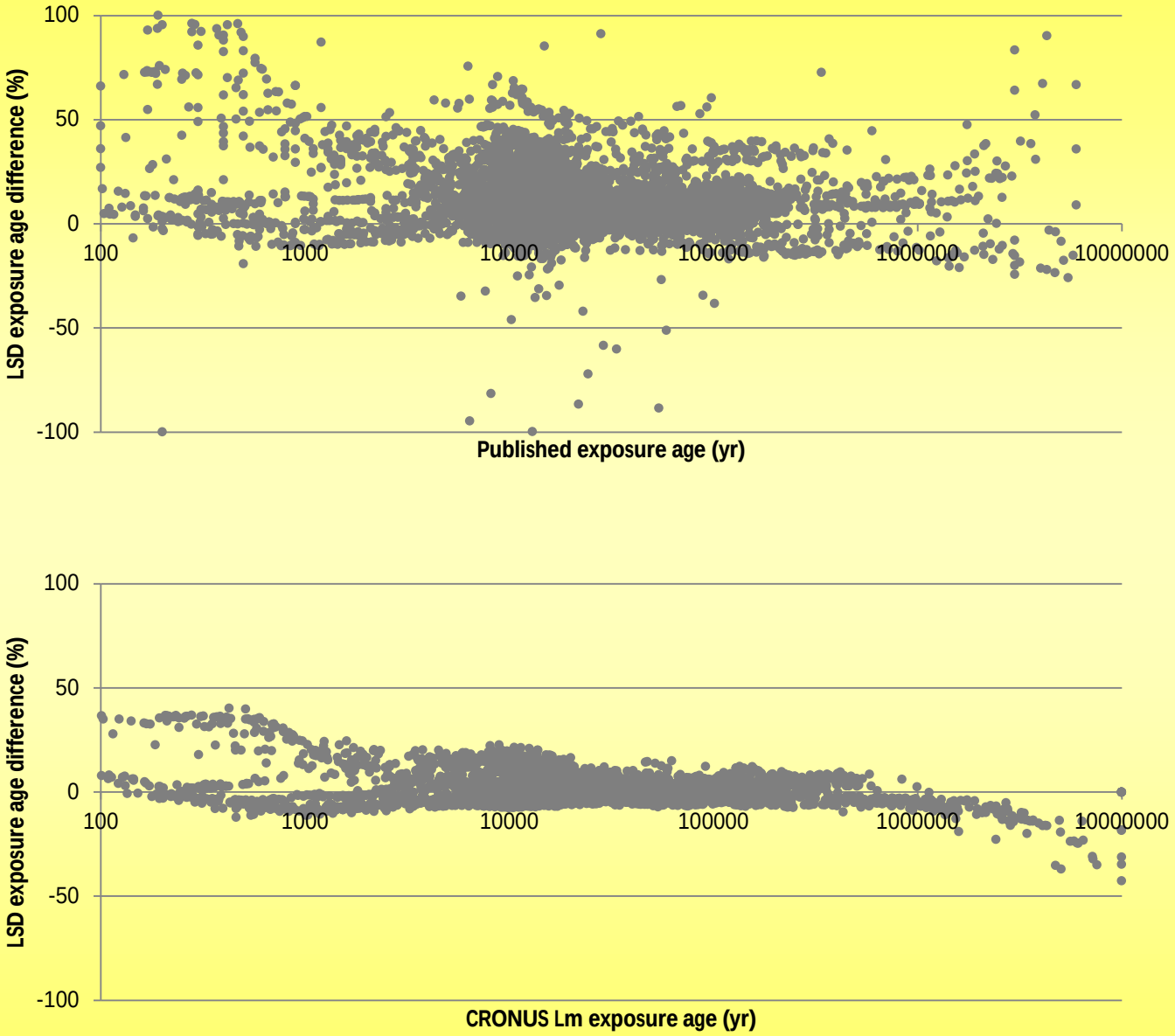
All exposure ages recalculated using the LSD production rate scaling (Lifton et al. 2014) in a CRONUS calculator setup






boulder/clast
bedrock
Exposure age (yr)
10000000
1000000
100000
10000
1000
100
Antarctica
South America
North America
Greenland
Europe
Africa
Asia
New Zealand / Australia
W
E
S
N
W
E
100000
80000
60000
40000
20000
0

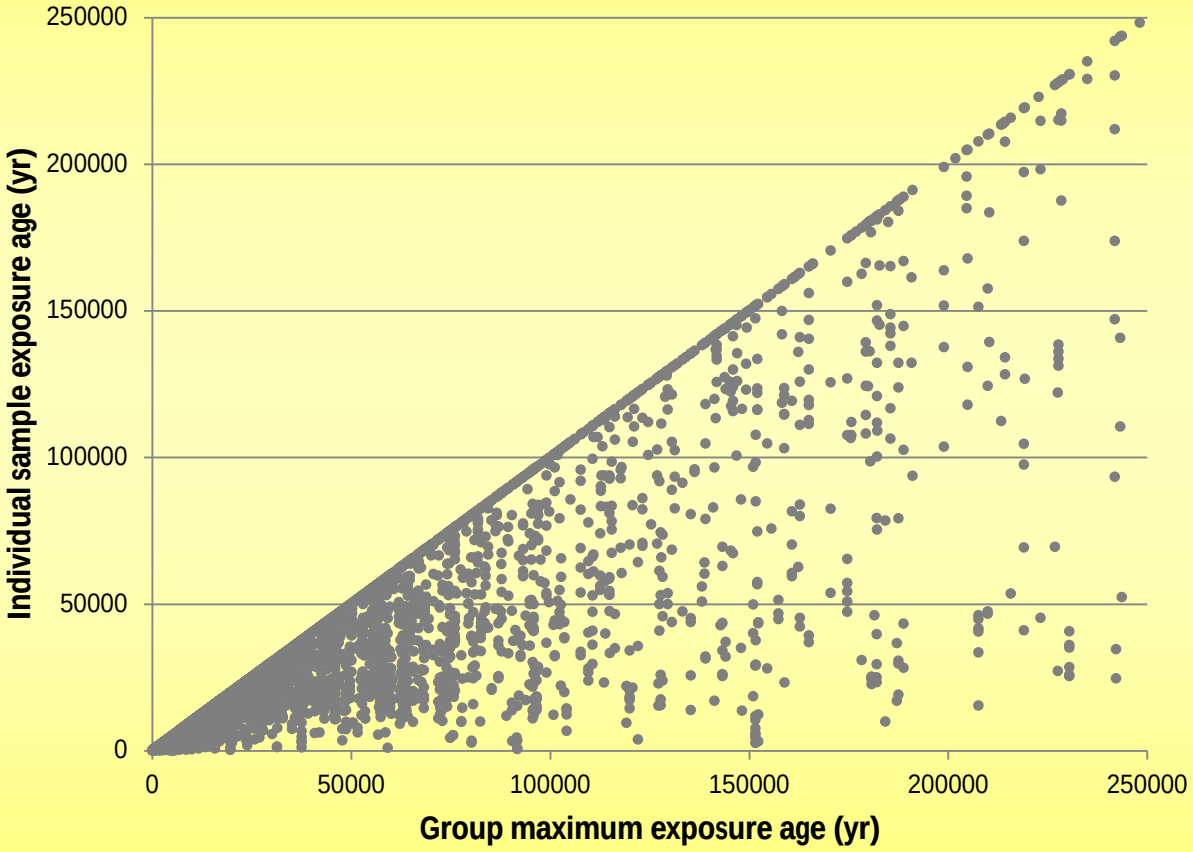
Exposure age calculation comparison

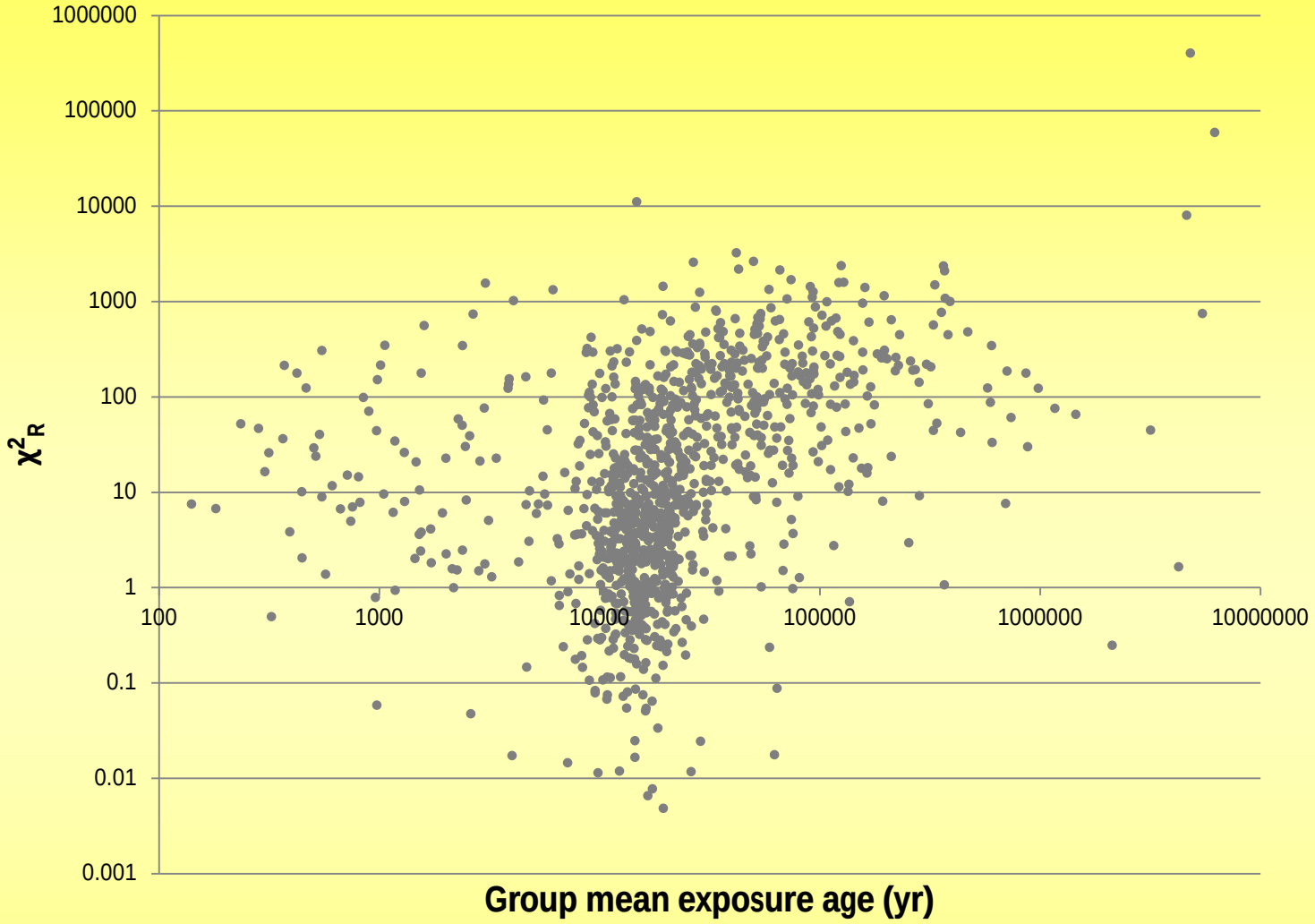


Sample grouping

All samples in one group were deglaciated at the same time

Scatter!

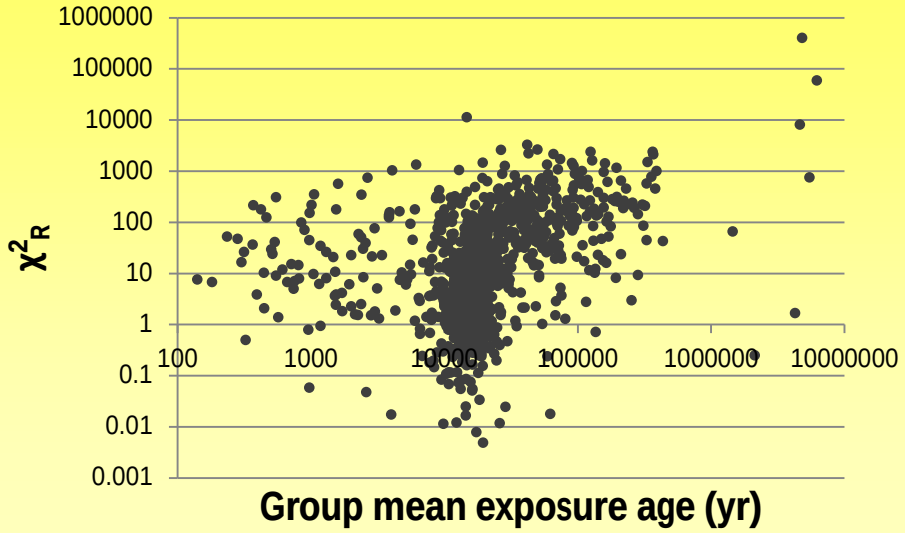

250000
200000
150000
100000
50000
0
Individual sample exposure age (yr)
0
50000
100000
150000
200000
250000
Group maximum exposure age (yr)



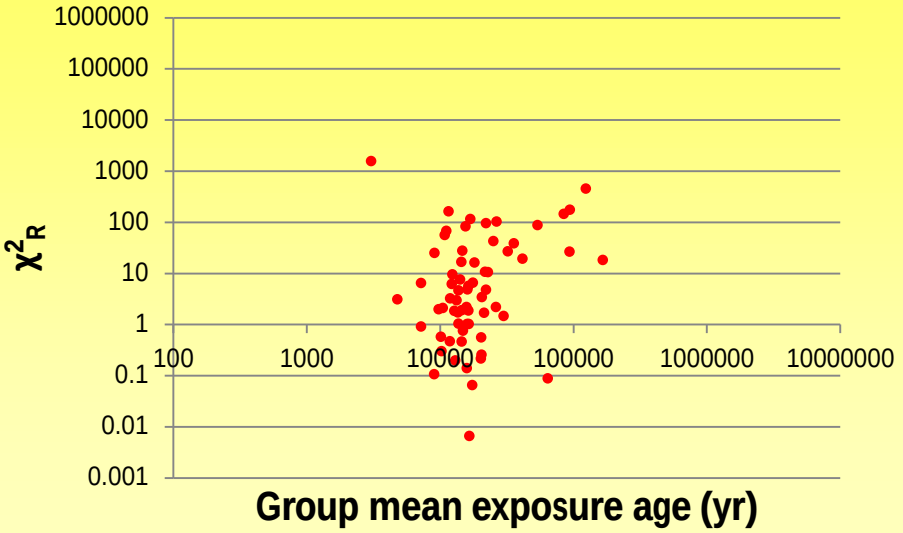
23% has a $\chi^2_R < 2$

1 and 2 sample groups excluded

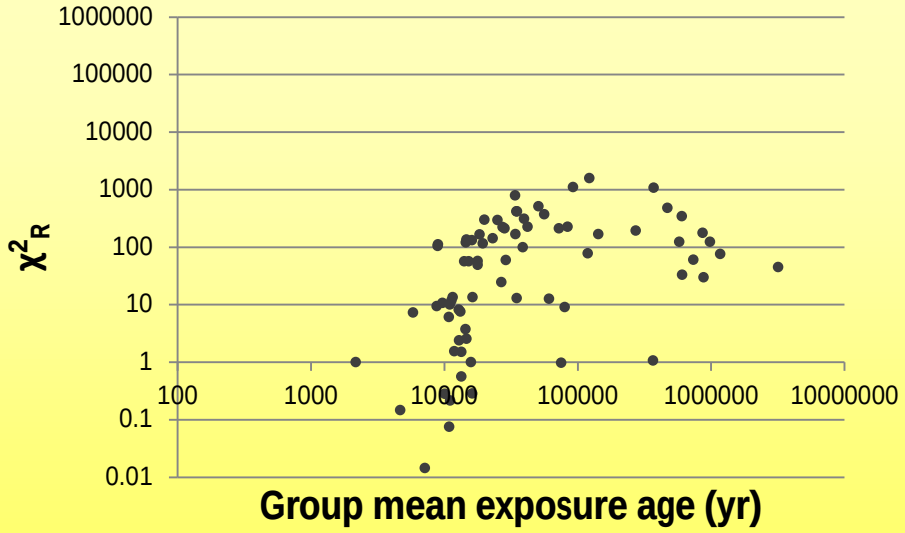
Glacial boulders/clasts: 23% < 2



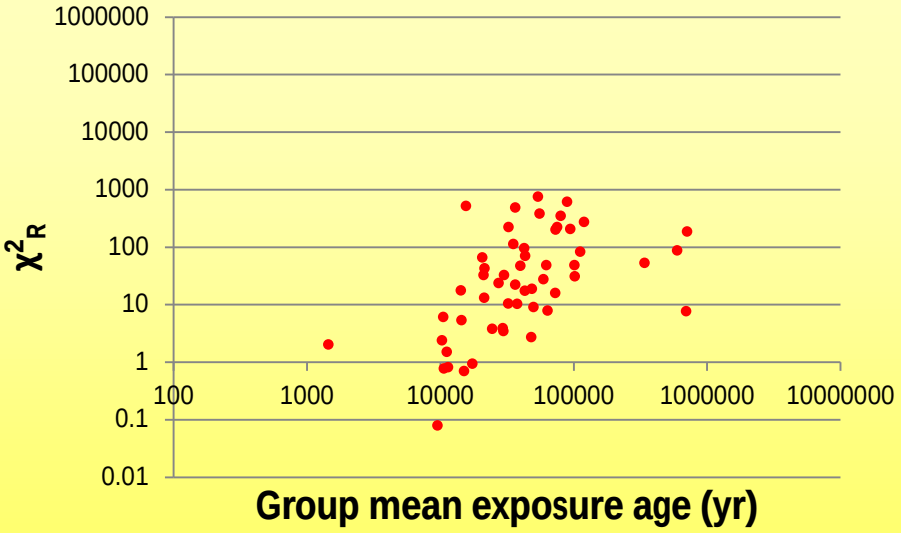
Glacial bedrock: 38% < 2



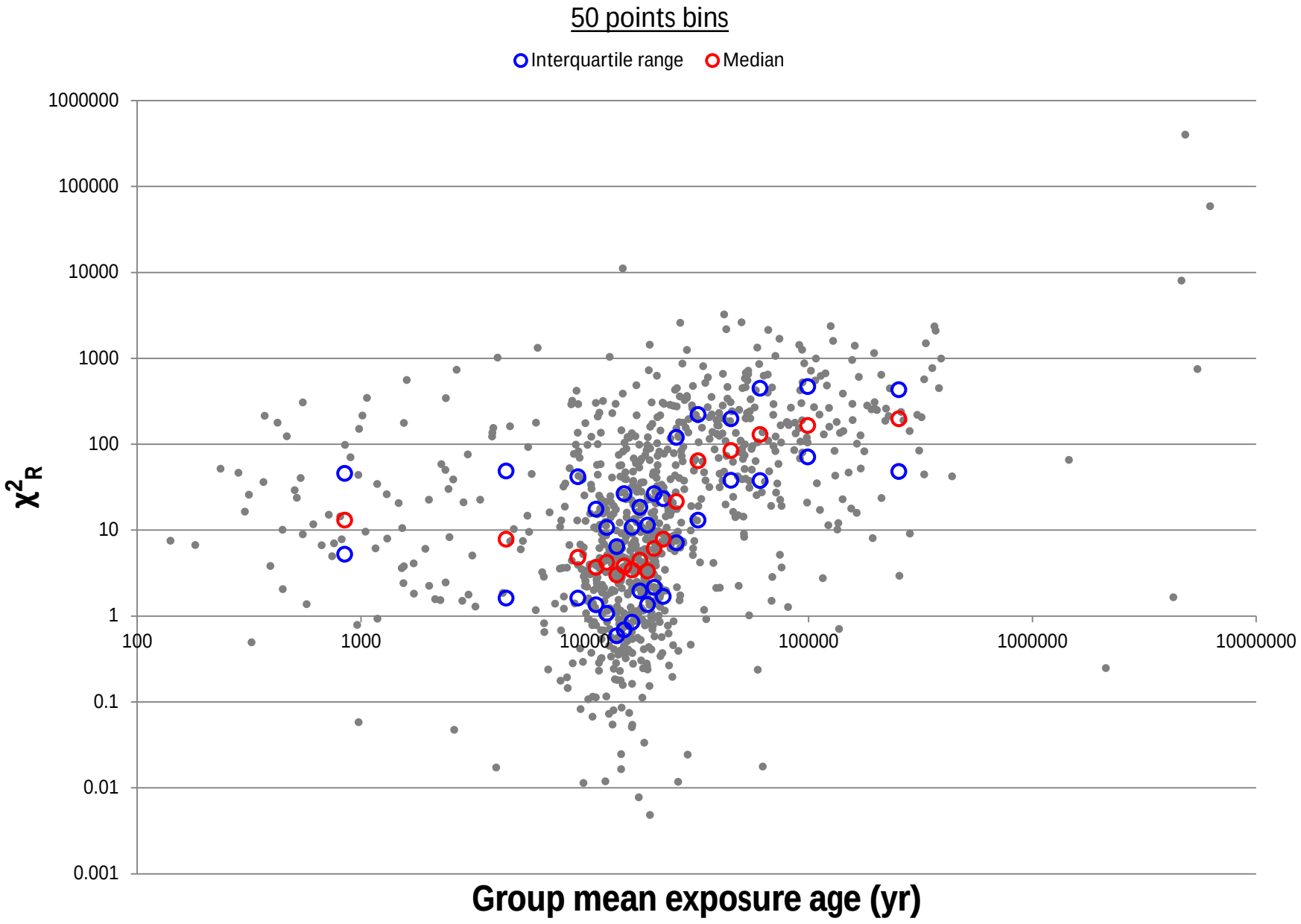
Relict boulders/clasts: 14% < 2



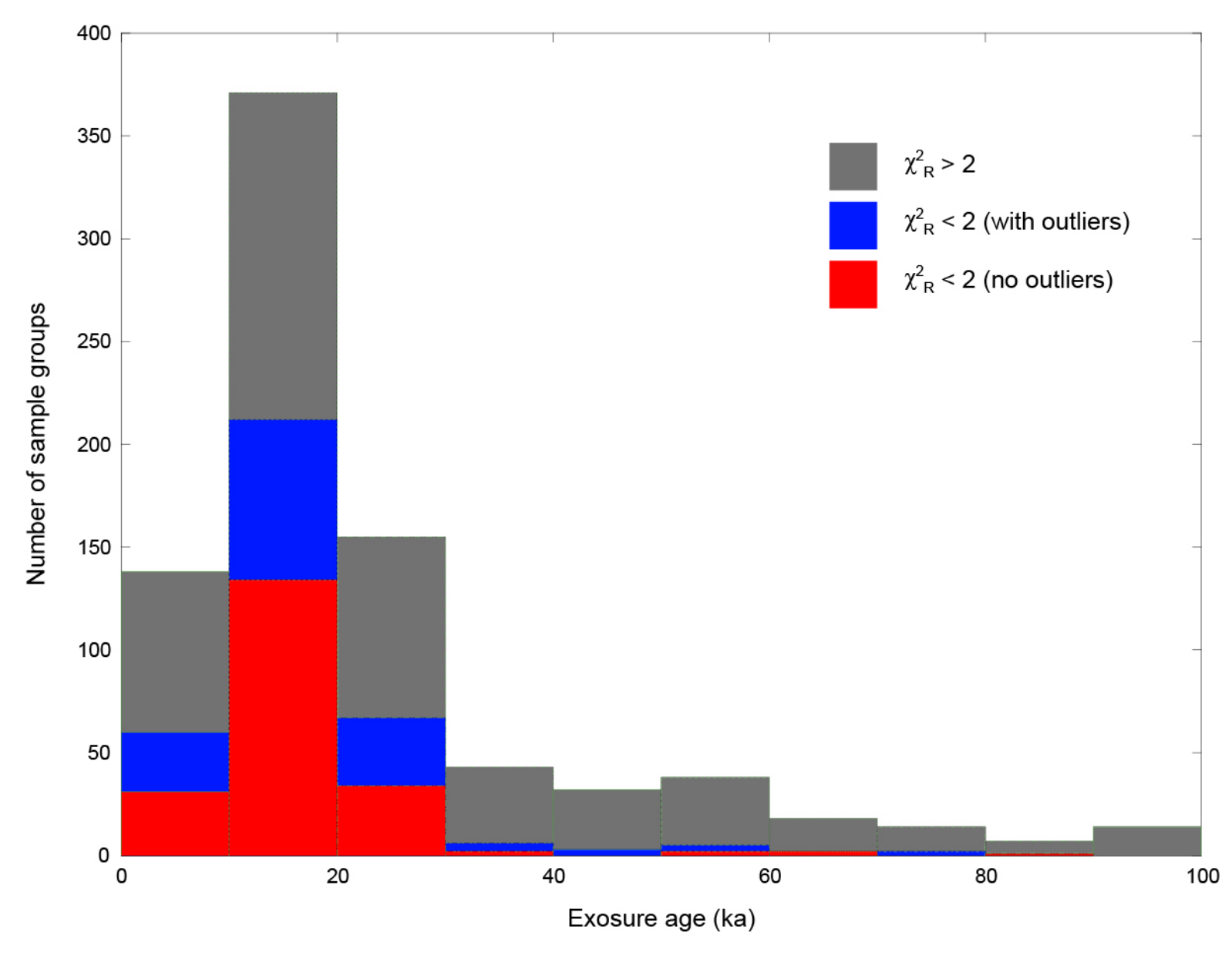
Relict bedrock: 11% < 2



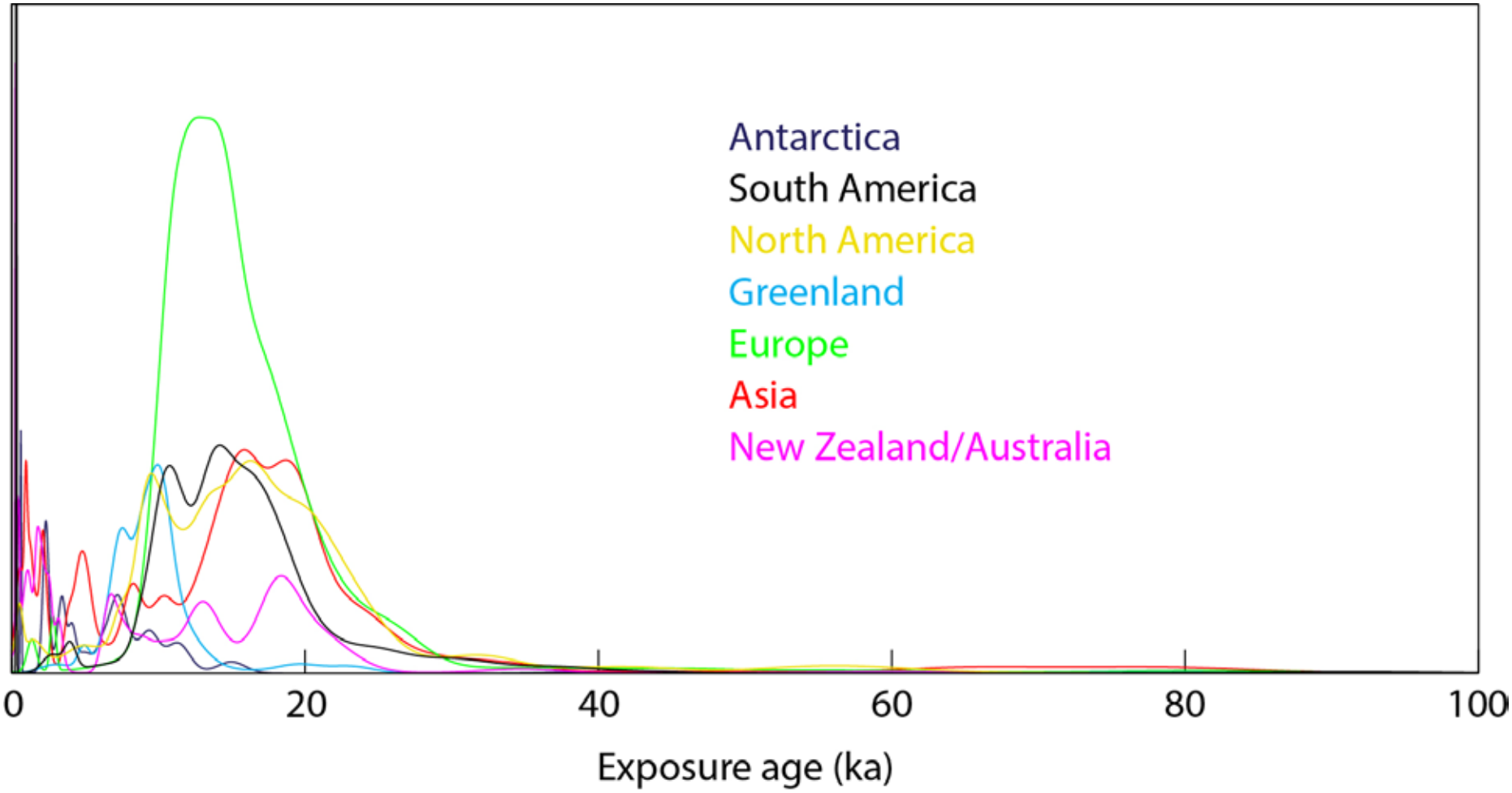
Glacial boulders/clasts



Glacial boulders/clasts



Global LGM and younger



Conclusions

- **Glacial exposure ages are typically scattered**
- **Well-clustered exposure ages are generally from the last major deglaciation or younger**
- **The absoluteness of glacial exosure dating rapidly decreases beyond the global LGM**


Thank you!