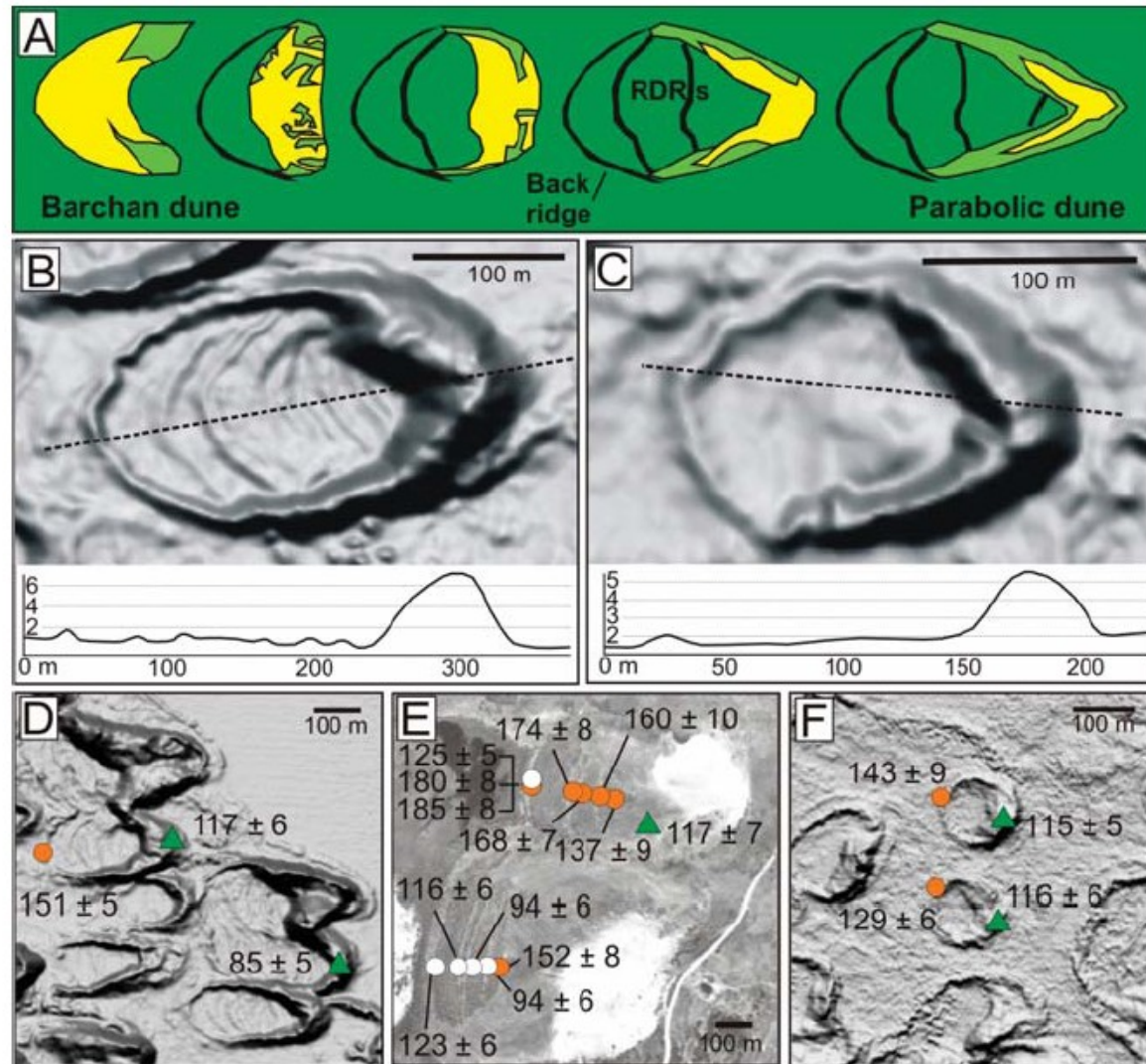


Should there be an agreed
datum for reporting
luminescence ages?

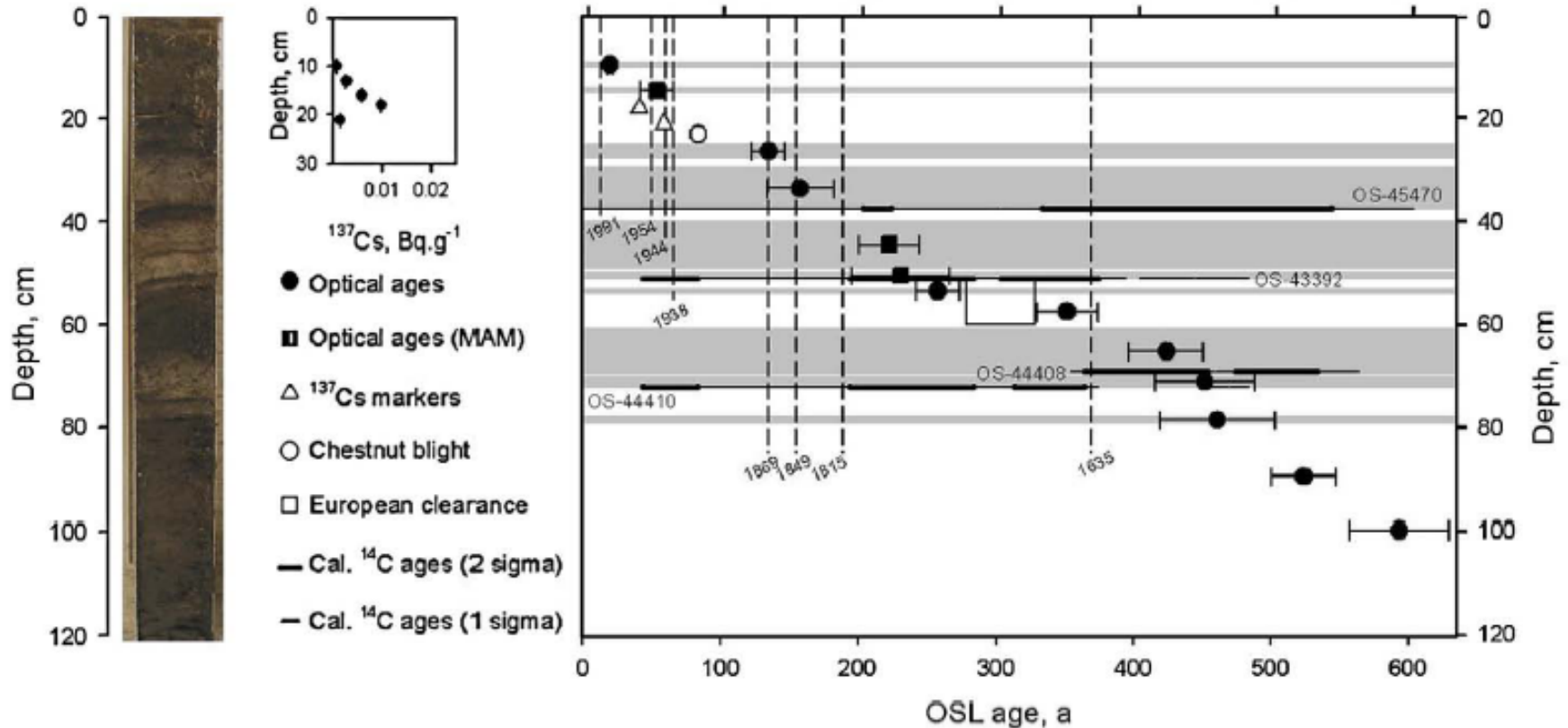
G.A.T. Duller

What is the problem?

- Wolfe and Hugenholtz
- Ages of dune reactivation from ~100 years ago

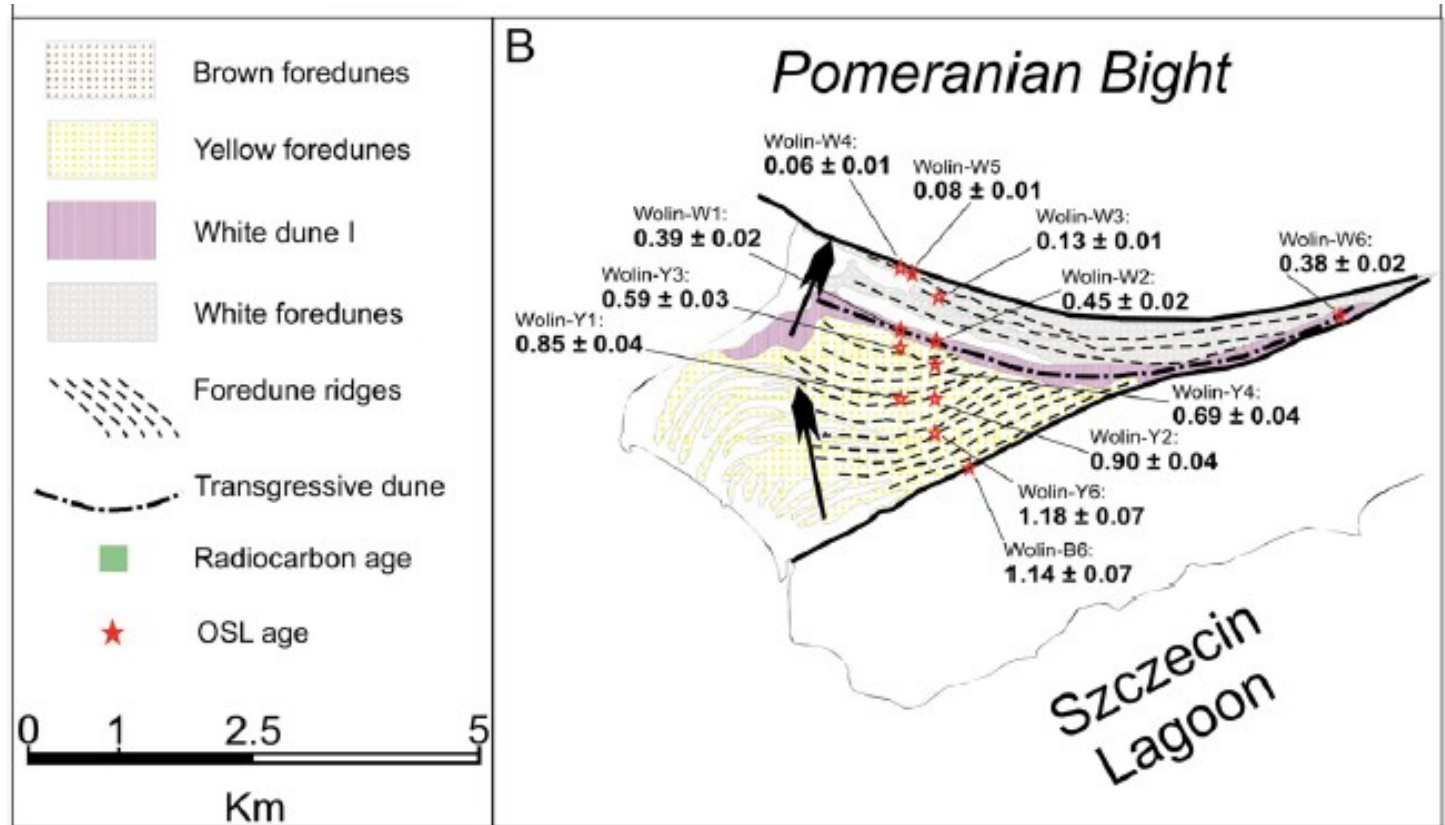


What is the problem?



- Madsen et al. – dating hurricane overwash sediments from ~20 to 500 years ago

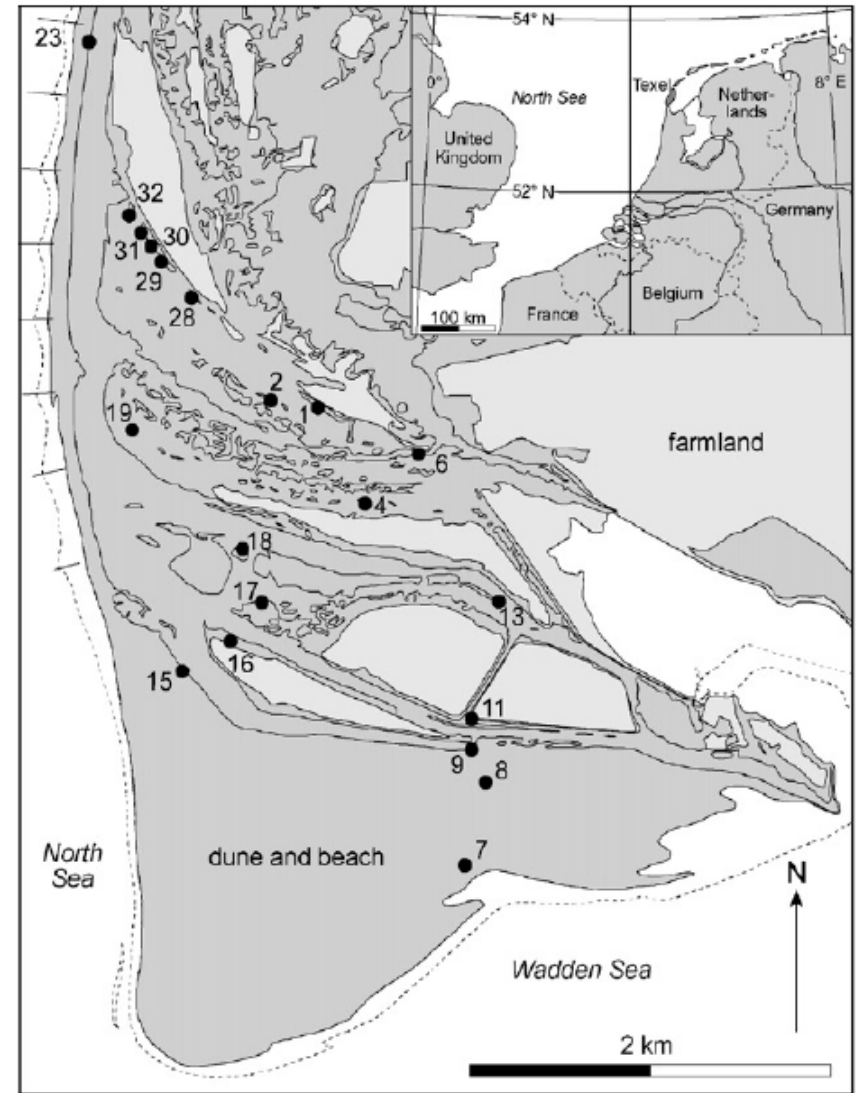
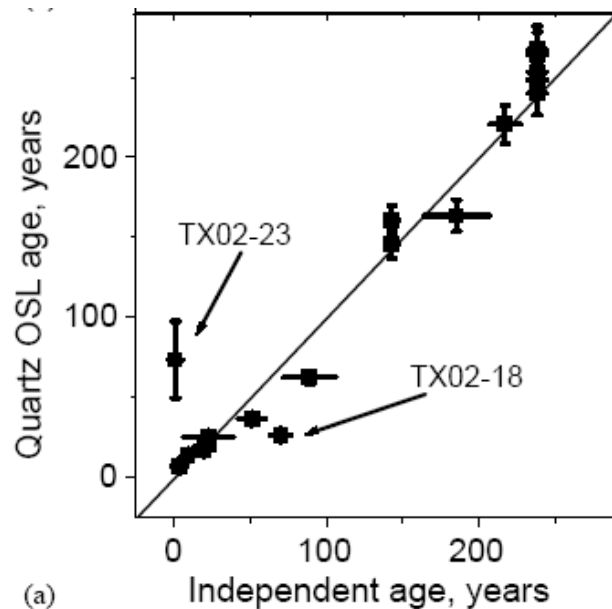
What is the problem?



- Reimann et al.
- Ages for Wolin spit (NW Poland)

What is the problem?

- Ballarini et al.
- Coastal dunes, Netherlands from 6 to 267 years ago



What is the problem?

- The problem is that we are too successful at producing ‘young’ ages!

$$\text{Age (ka)} = \frac{\text{Equivalent Dose (Gy)}}{\text{Dose Rate (Gy/ka)}}$$

- We calculate an “age” – the period of time between some resetting event and when we measure the sample
- For a given “date”, the age we calculate will vary depending upon when we measure it
- Hurricane ‘Bob’ hit NE USE in 1991 - Madsen et al (2009) determined an age of 20 ± 2 a for this event. In ten years time someone would measure 30 a
- Ollerhead et al (1994) obtained an age of 12 ± 2 a for the end of Buctouche spit – that sediment today should yield 25 years ago – More than twice the age!

Editorials by Grün (2008) QG 3, 1 and Rose (2007) QSR 26, 1193

Wolff, E. W. (2007). When is the present? *Quaternary Science Reviews* 26, 3023-3024.

Discussing ALL geochronological methods – but coming from a background in the ice core community

1. there is a need for all papers to clearly state what their zero age is
2. should we all agree (in different communities) to use the same zero?
3. what should that common zero be?
4. what notation should we use to express it?

Radiocarbon

- Radiocarbon overcomes this problem by having an agreed datum (AD1950) against which to express their results

e.g. 325 ± 15 ^{14}C yrs BP

- Should the luminescence community do something similar?

(This is not something new - Miallier et al. (1983) Comments on the quotation of TL dates. Ancient TL 1-3)

How is it “solved” at the moment?

1. Quote the age and the year in which it was measured

$34 \pm 7a$ measured in AD 2004

BUT – leaves us prone to summaries that fail to include reference year, and involves unnecessary arithmetic to compare data from different studies and methods

2. Convert the age to a date in AD/BC

AD 1970 ± 7 or AD 1963-1970

BUT – increasing numeric values around AD 1 (e.g. BC 134, BC 64, AD 6, AD 76) and one loses information on relative error

Some Possibilities

1. The status quo.

Quoting luminescence ages along with the year in which they were measured. These can also be quoted as years AD (ACE) or BC (BCE).

2. Adopt a datum of AD 1950 and use the term BP

BP (before present) reserved for use with radiocarbon dates – this would cause confusion.

3. Adopt a datum of AD 1950 and use an alternative term instead of BP

Once C-14 was calibrated then ages from both methods should be directly comparable. An alternative term to BP would be required.

4. Adopt a datum of AD 2000 and use the term b2k

Use a different datum (AD2000) and term b2k (before 2000 AD). This is being used by other dating methods (e.g. Wolfe 2007)

What should we do?

- Views of the community – you!
- Can we come to an agreement for how luminescence ages should be reported?
- Editorial in Quaternary Geochronology