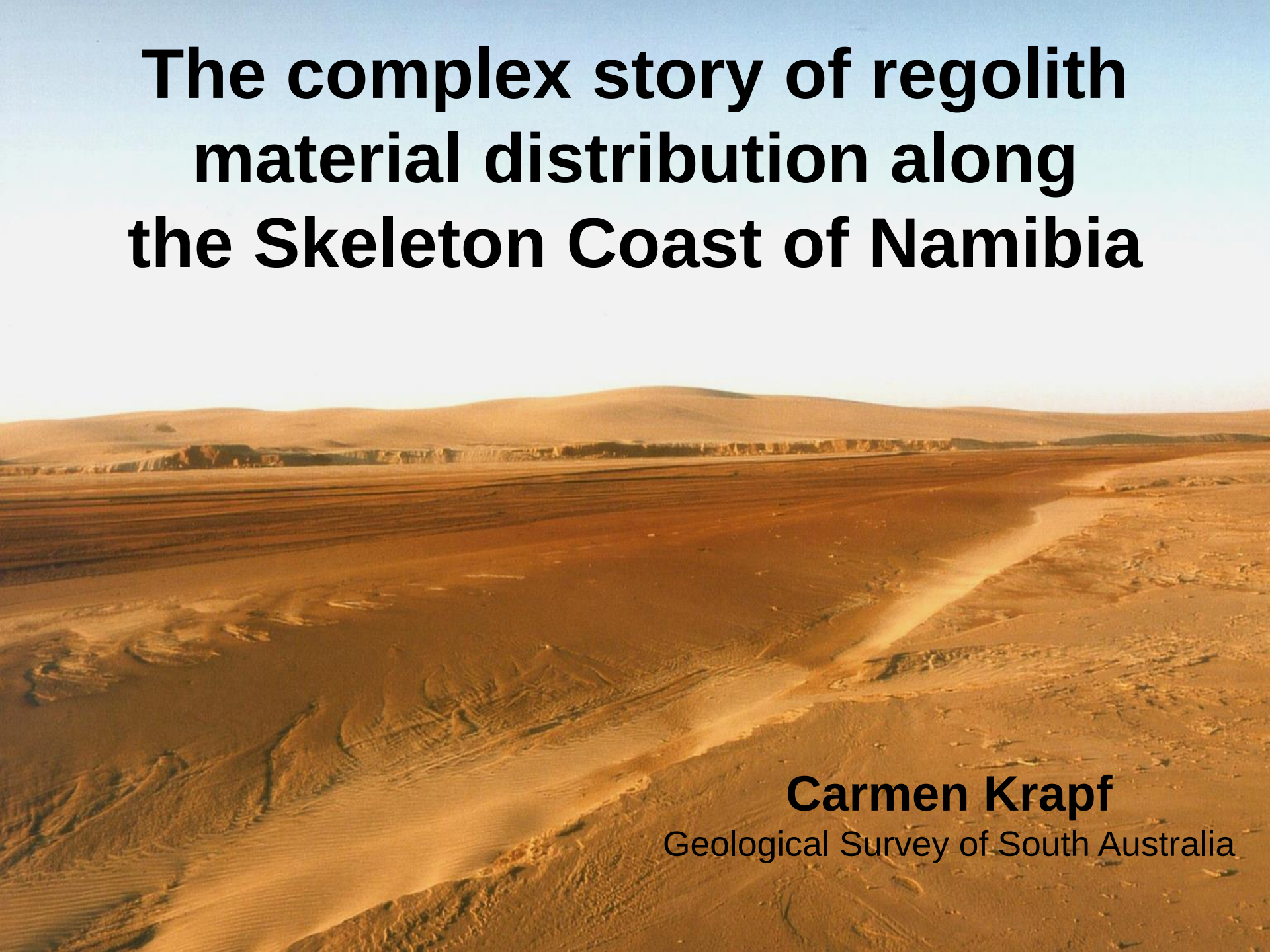
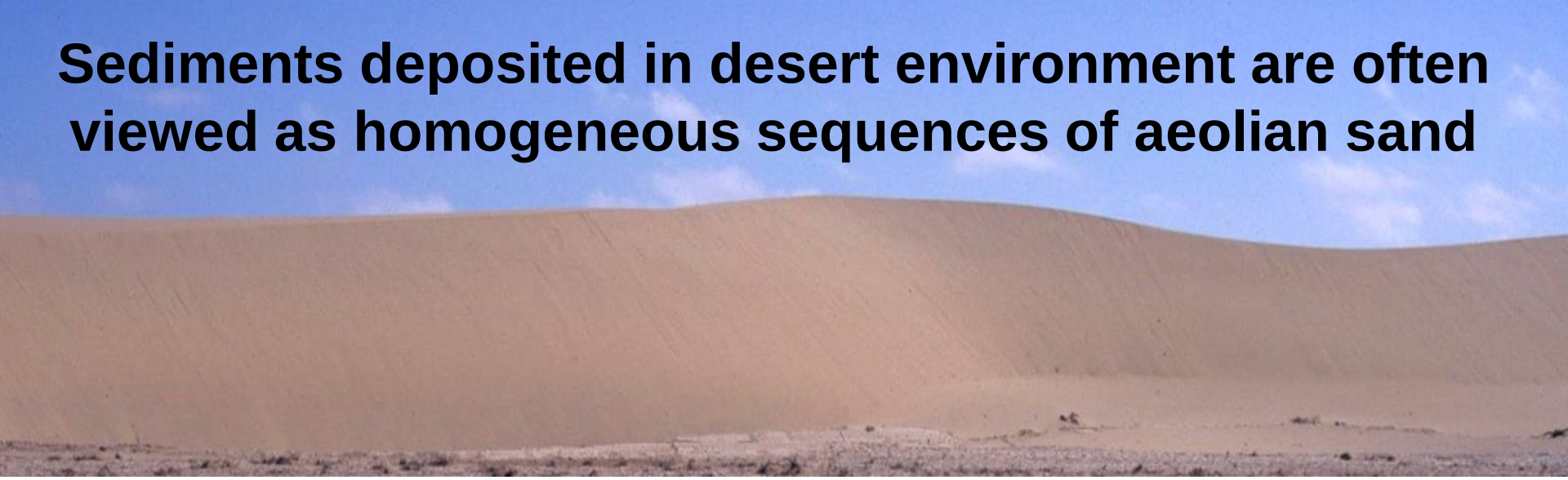
The complex story of regolith material distribution along the Skeleton Coast of Namibia



Carmen Krapf
Geological Survey of South Australia

Sediments deposited in desert environment are often viewed as homogeneous sequences of aeolian sand



BUT:

- deposits are product of complex interaction of wind- and water-driven processes
- aeolian, fluvial, lacustrine and even marine settings are common, giving rise to a variety of depositional environments




Aim

- characterisation of fluvio-aeolian interactions

- understanding dynamic and variability of processes causing fluvio-aeolian interaction

- considering variabilities of parameters within fluvio-aeolian systems

➡ understanding dispersion of various transported regolith materials throughout the landscape

➡ enhancement of characterisation, interpretation and reconstruction of fluvio-aeolian depositional environments

Study area


Namibia
Windhoek
Botswana
Gaborone
South Africa
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US Dept of State Geographer
34 J 724568.16 m E 7243865.98 m S elev 1050 m

Study area

- Skeleton Coast, NW Namibia
- five ephemeral river systems
- Skeleton Coast Erg

- <u>Climate:</u>

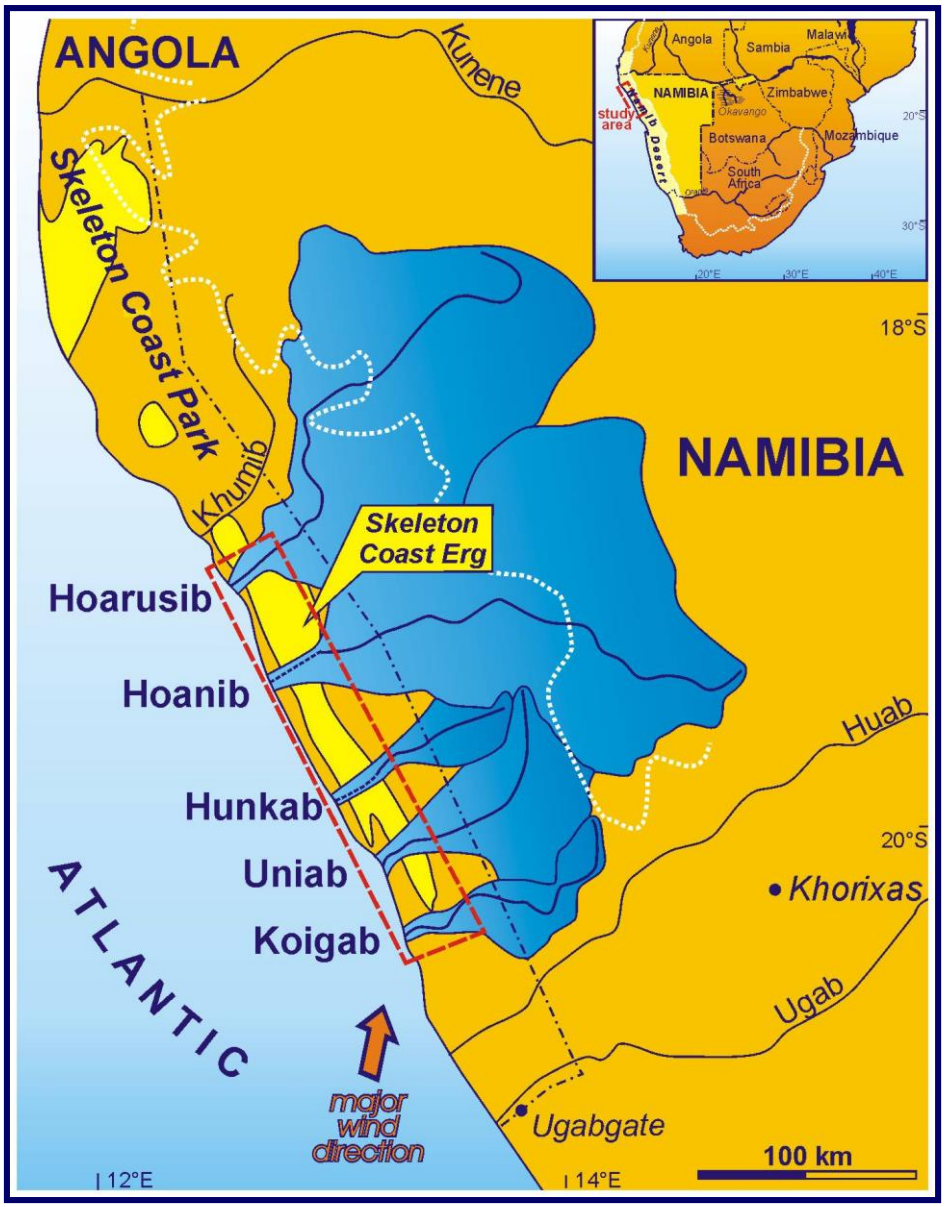
  coast → hyper-arid (0-20 mm/a)

  interior → arid to semi-arid (100-350 mm/a)

- <u>Wind regime:</u>

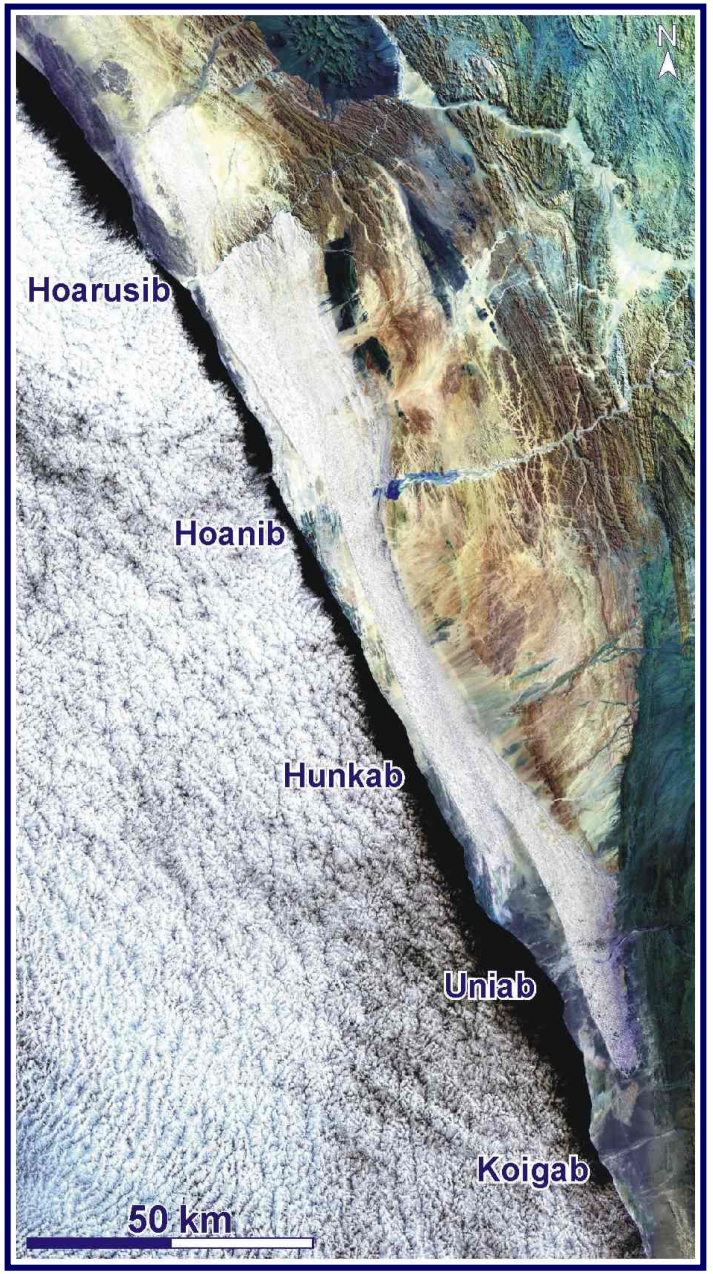
  S-SSW (throughout year)

  E (seasonal; 'Bergwind')



Study area - Skeleton Coast Erg

- 2000 km^2
- 165 km length
- 6-20 km width
- barchanoid, compound & transversal dunes
- dune hights: 20-50 m
- age: LGM

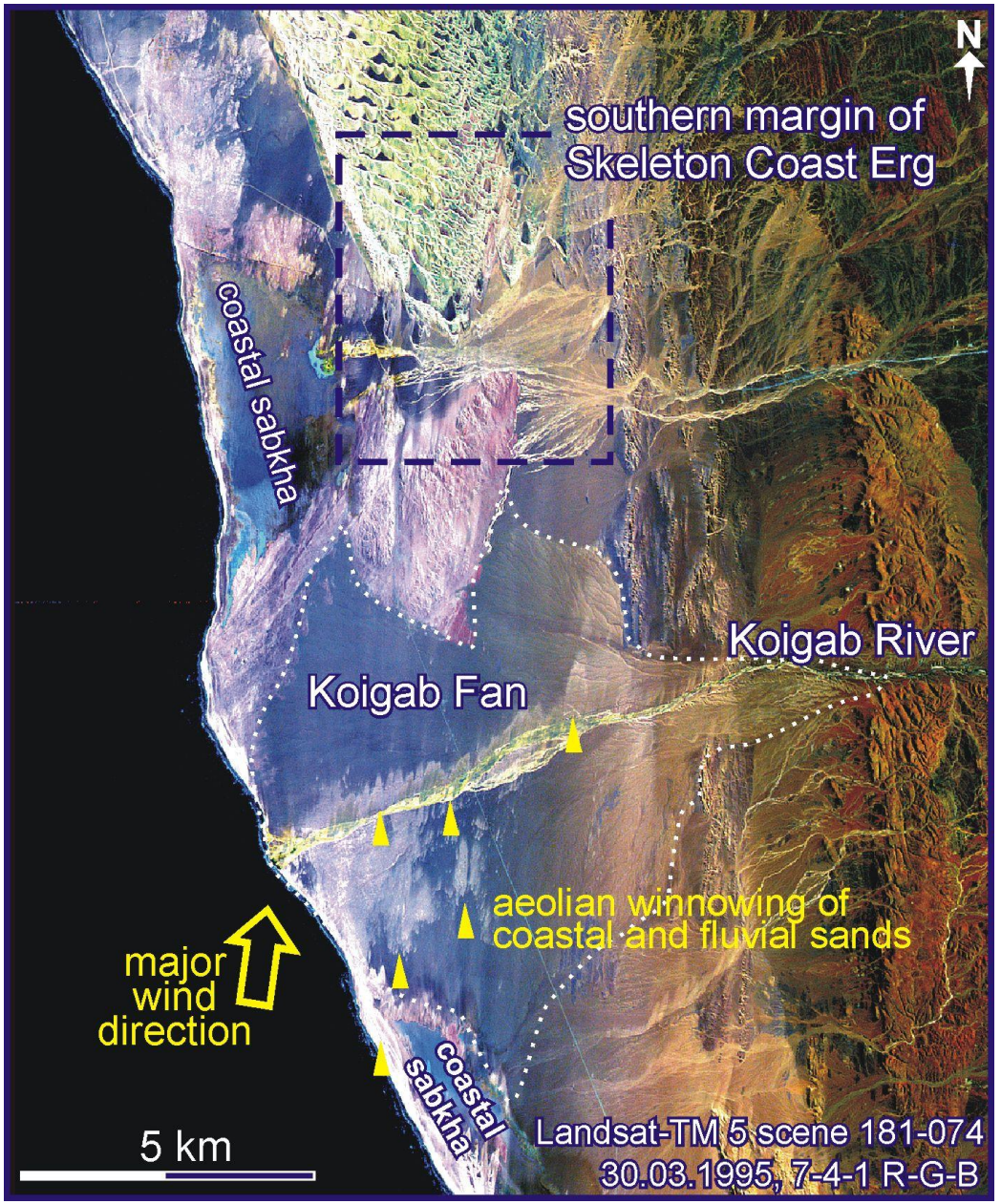


Koigab

- river length: 130 km
- catchment area: 2.400 km^2
- Koigab Fan

<u>observed types of fluvio-aeolian interaction:</u>

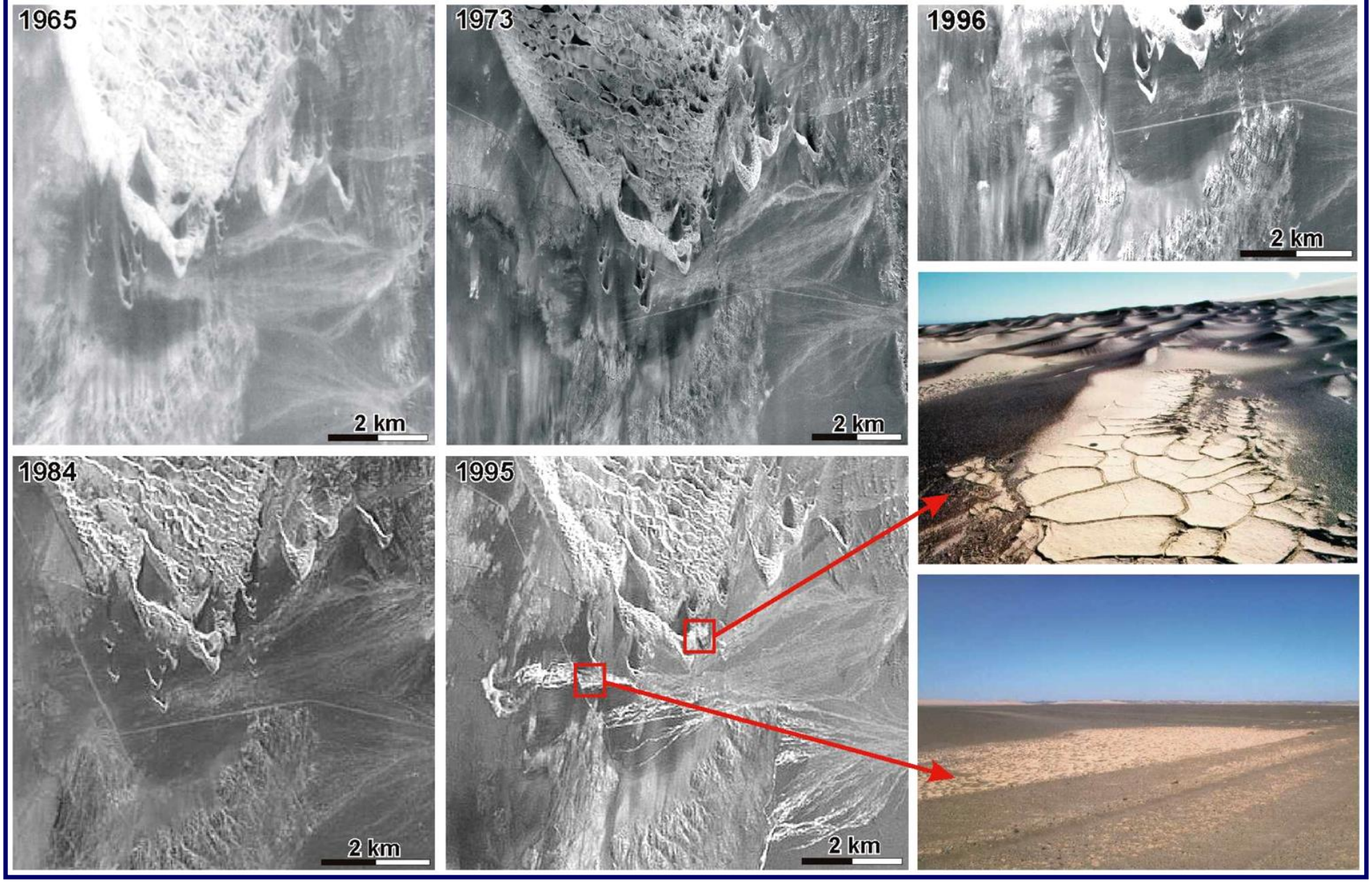
- deflation of fluvially derived material out of the river bed after flood events
- sediment source area for neighbouring erg
- sediment bypass
- fluvial erosion of dunes by river run-off



Koigab

sediment bypass, deflation surfaces

Southern erg boundary

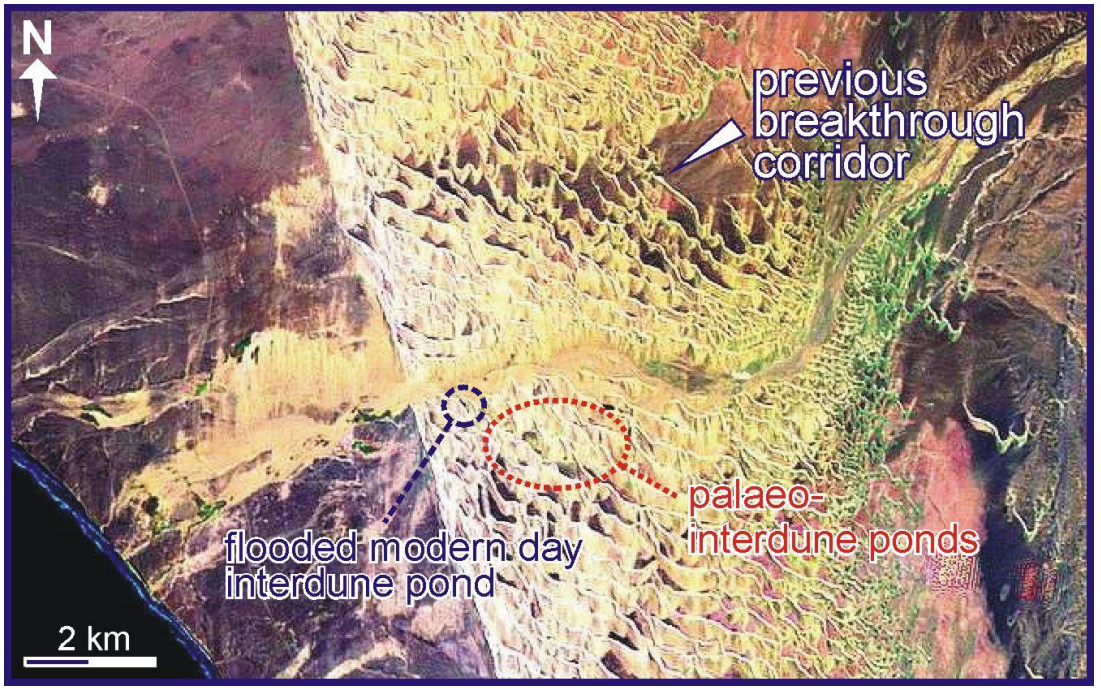


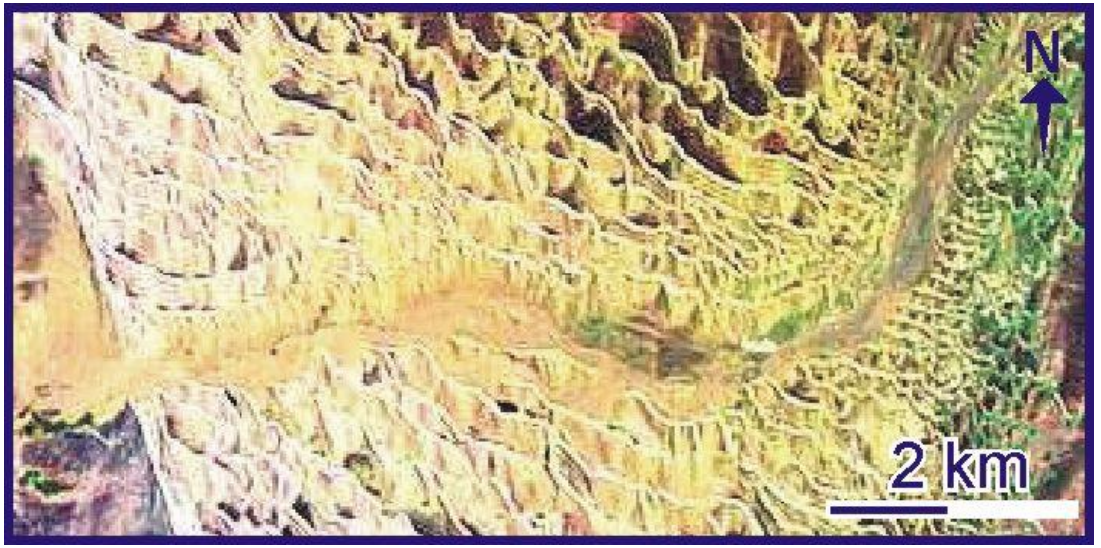
Uniab

- river length: 110 km
- catchment area: 4.500 km^2

<u>observed types of fluvio-aeolian interaction:</u>

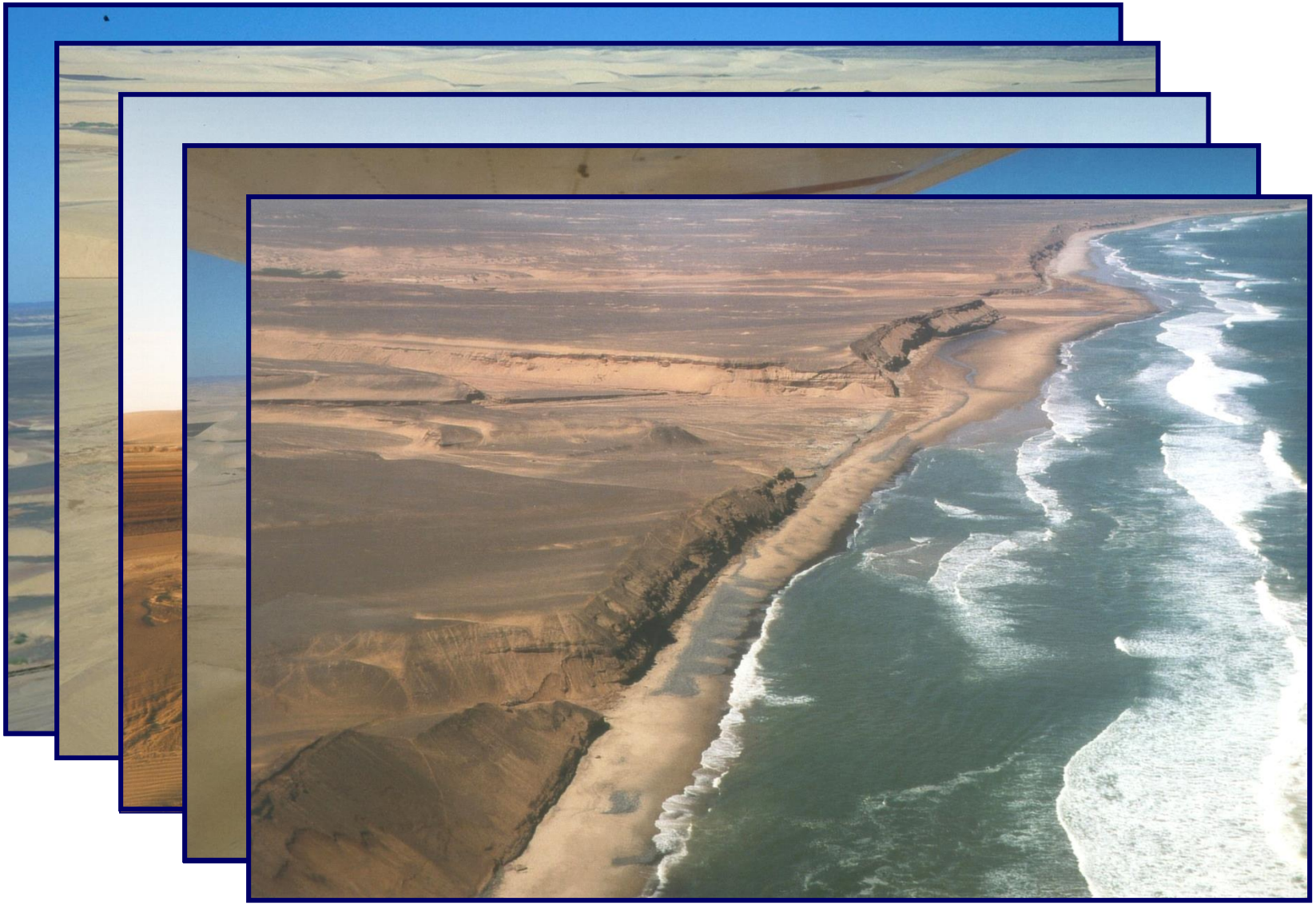
- development of a permanent river valley through erg
- flooding of interdune areas
- deflation of fluvially derived material out of river bed into erg
- erosion of dunes during flood run-off





Uniab

Uniab river course through Skeleton Coast Erg



Uniab

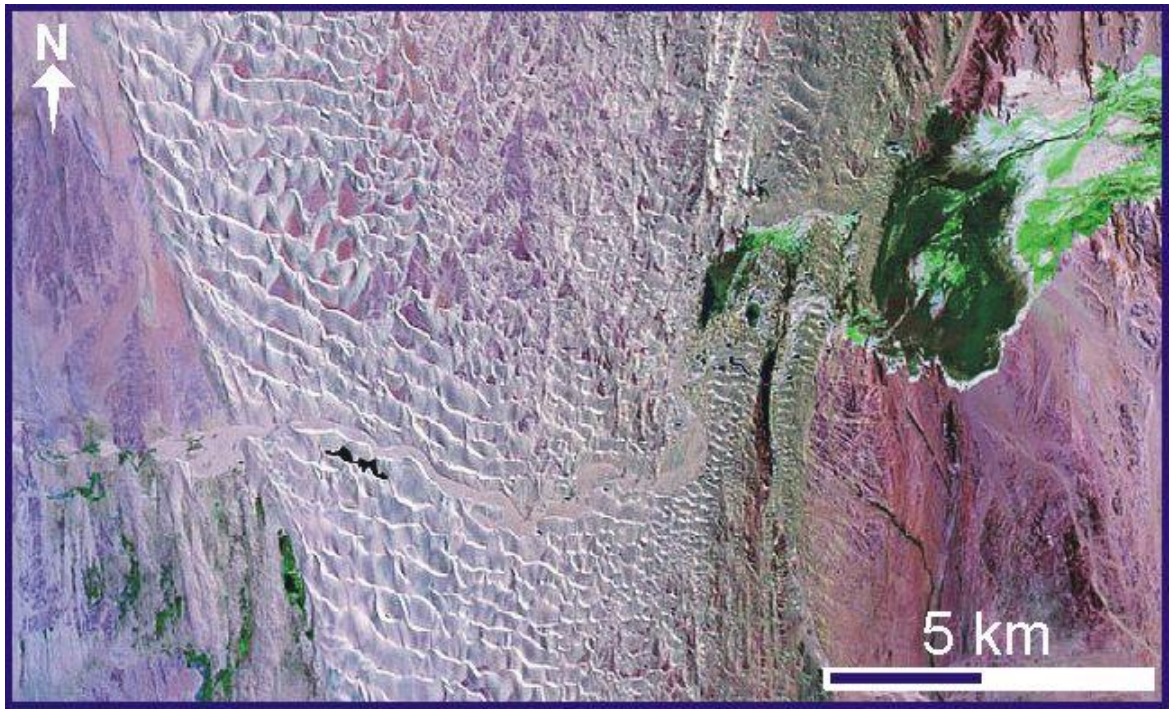
flooded interdune areas – modern and ancient

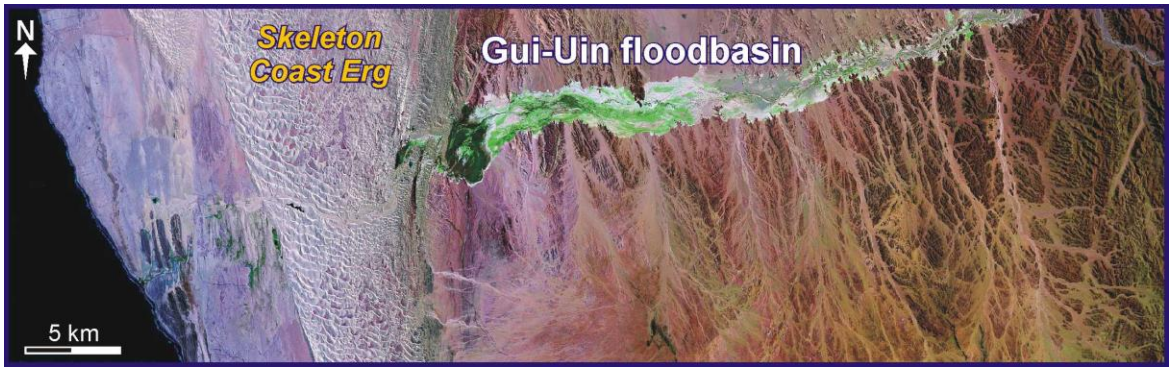
Hoanib

- river length: 270 km
- catchment area: 17.200 km^2

<u>observed types of fluvio-aeolian interaction:</u>

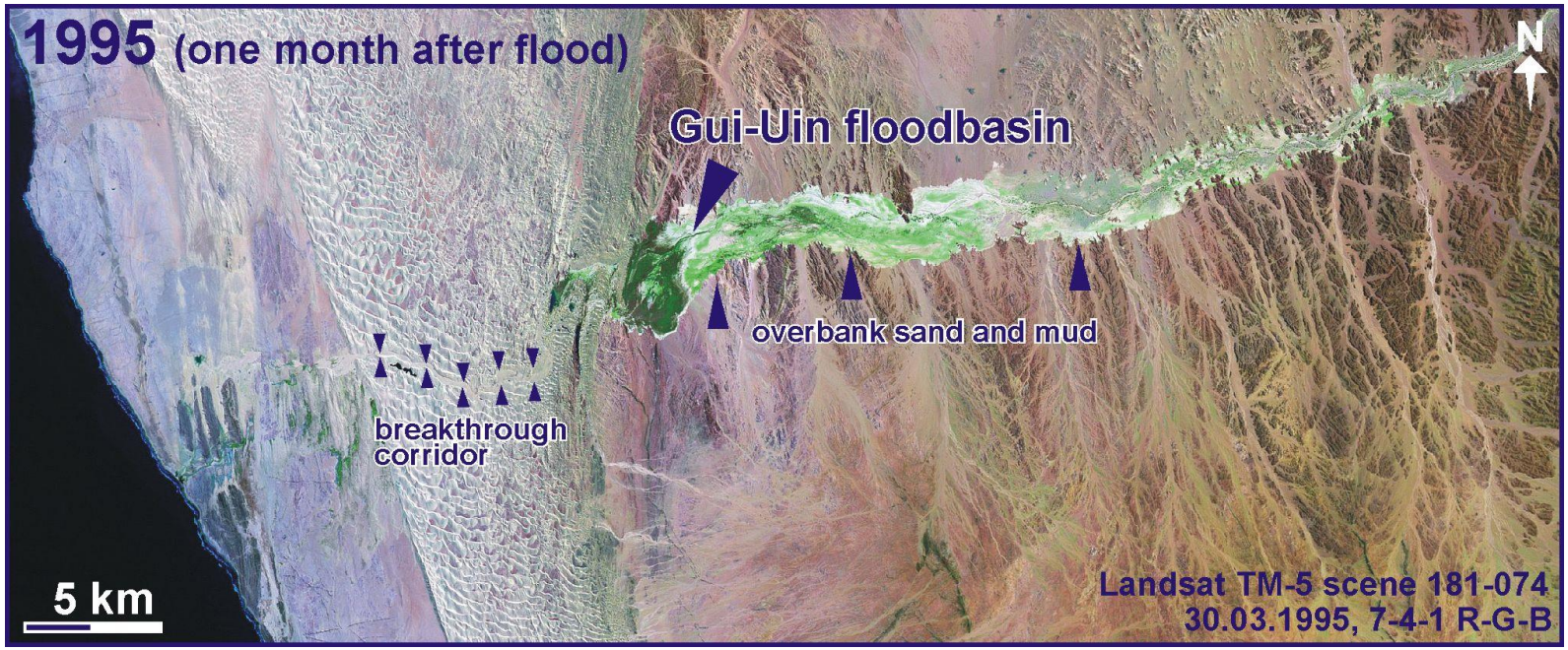
- river damming by dunes causing development of 20 km long floodbasin outside the erg
- river breakthrough through dunebelt
- revelopment of interdune floodponds
- floods are aligned to orientation of transversal dunes

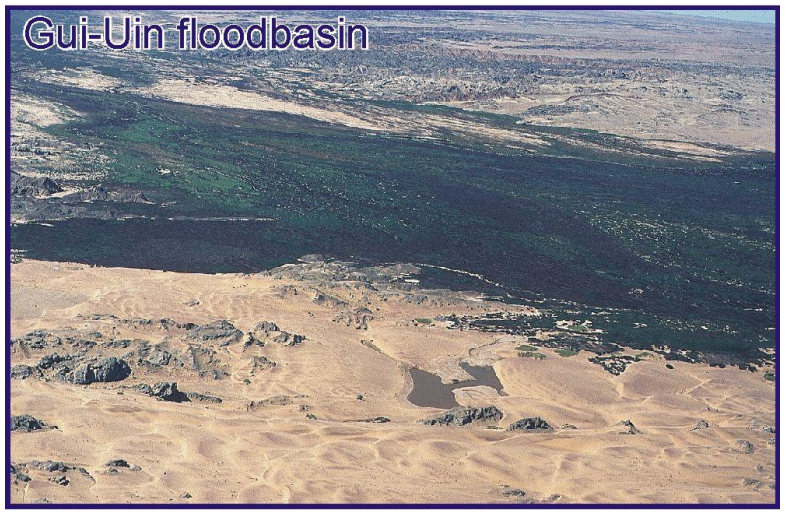




Hoanib

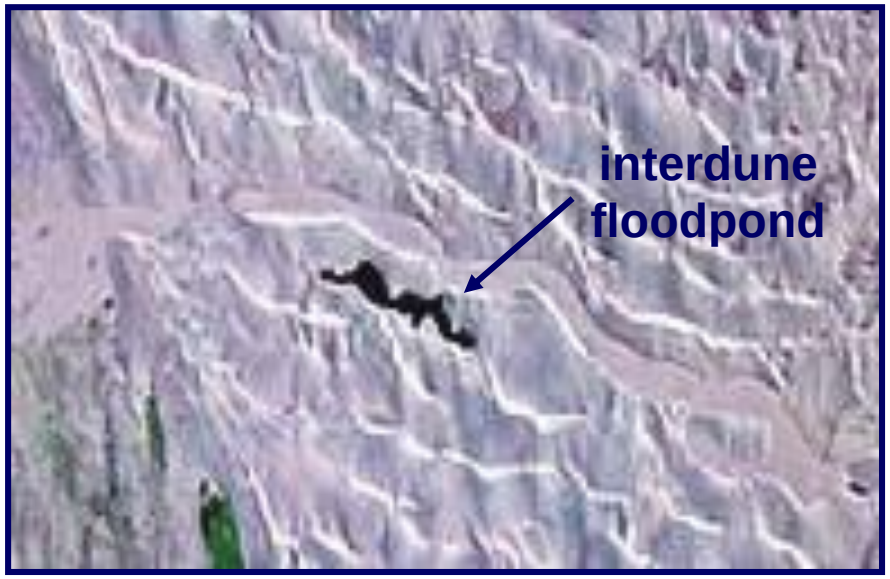
floodbasin and breakthrough corridor

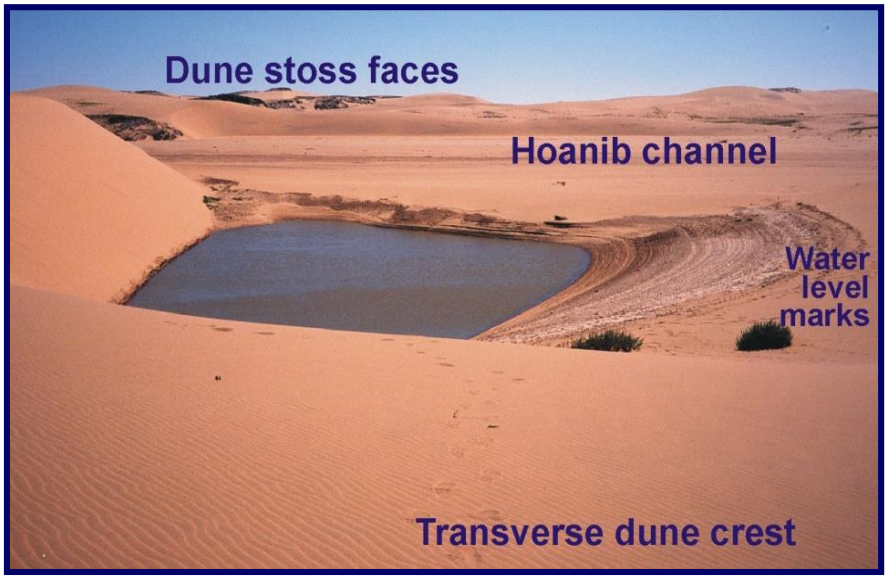


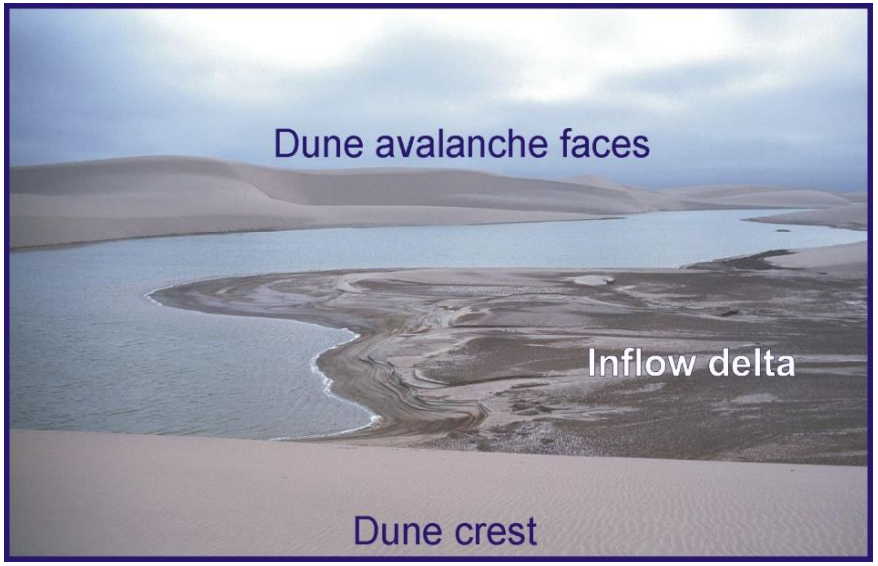


Hoanib

floodponds







Hoarusib

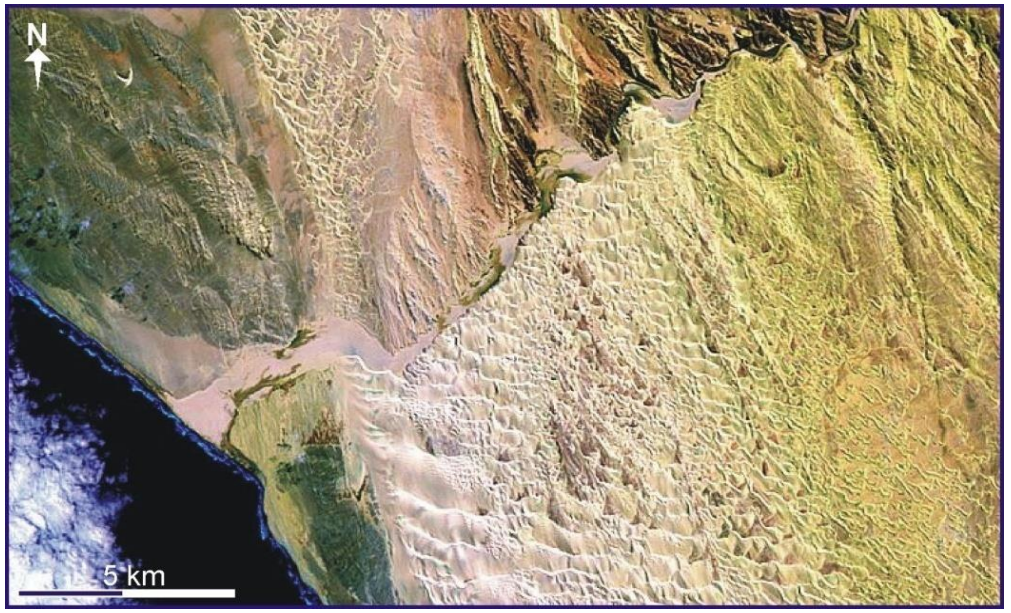
- river length: 300 km
- catchment area: 15.100 km^2

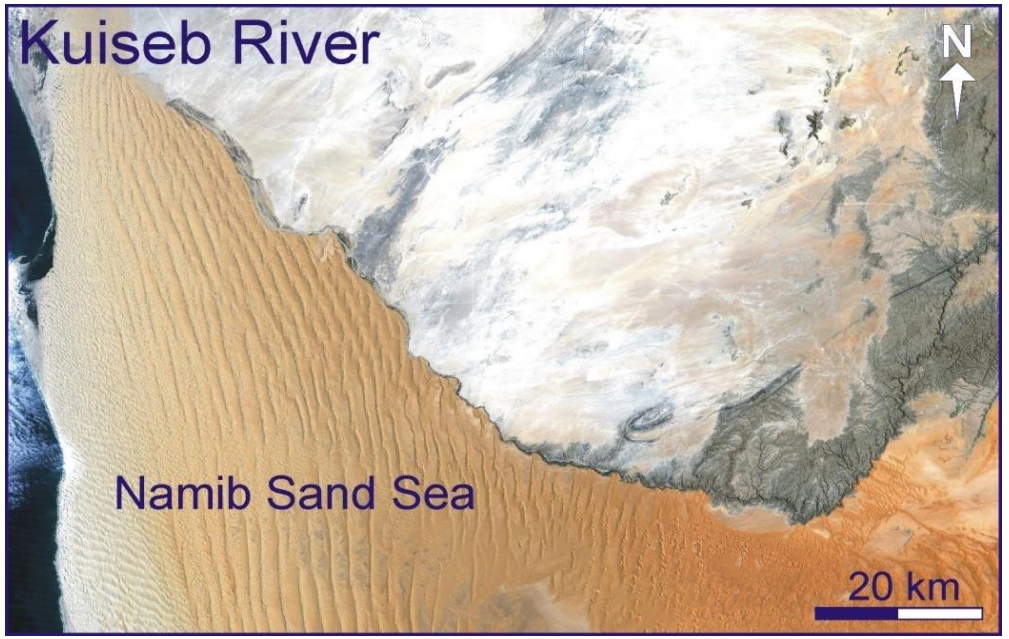
<u>observed types of fluvio-aeolian interaction:</u>

- termination of Skeleton Coast Erg

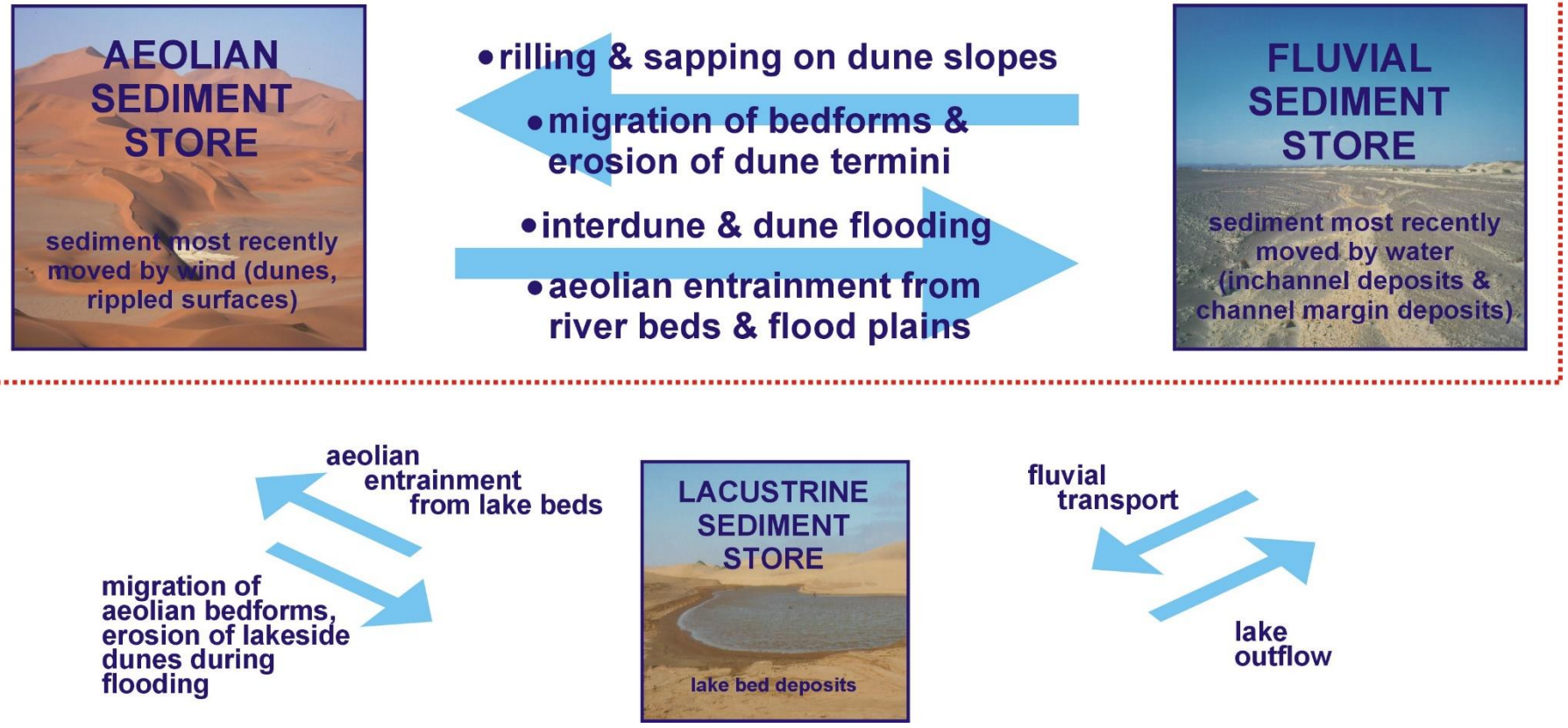
- preventing northward aeolian sand transport by frequent river run-off

- situation comparable to Kuiseb River, Central Namib





Conclusions



Acknowledgements

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