Concordia: a new permanent, international research support facility high on the Antarctic ice cap

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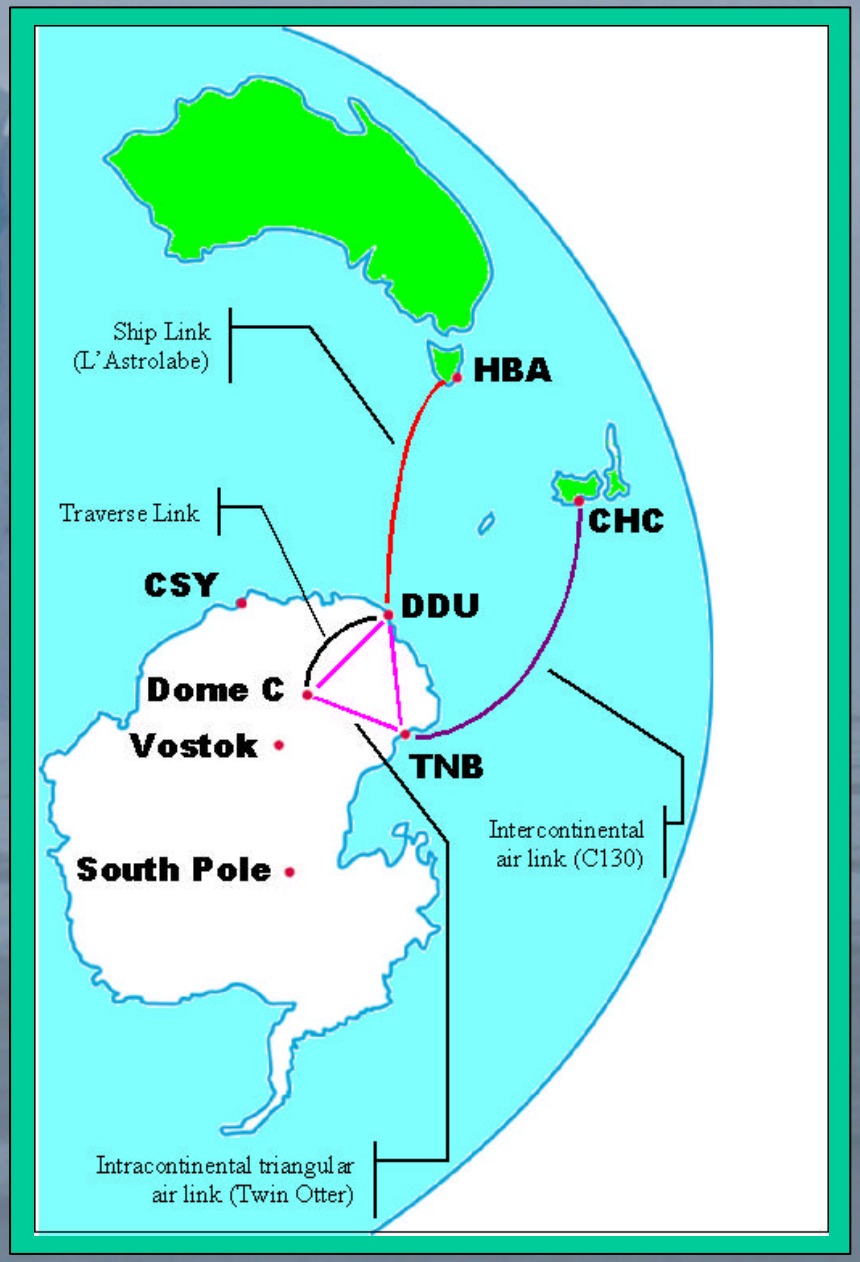


Concordia at Dome C

- Why Dome C
- The Dome C Site
- Surface Transport
- Light Plane Transport
- Building Design Concept

Why Dome C?

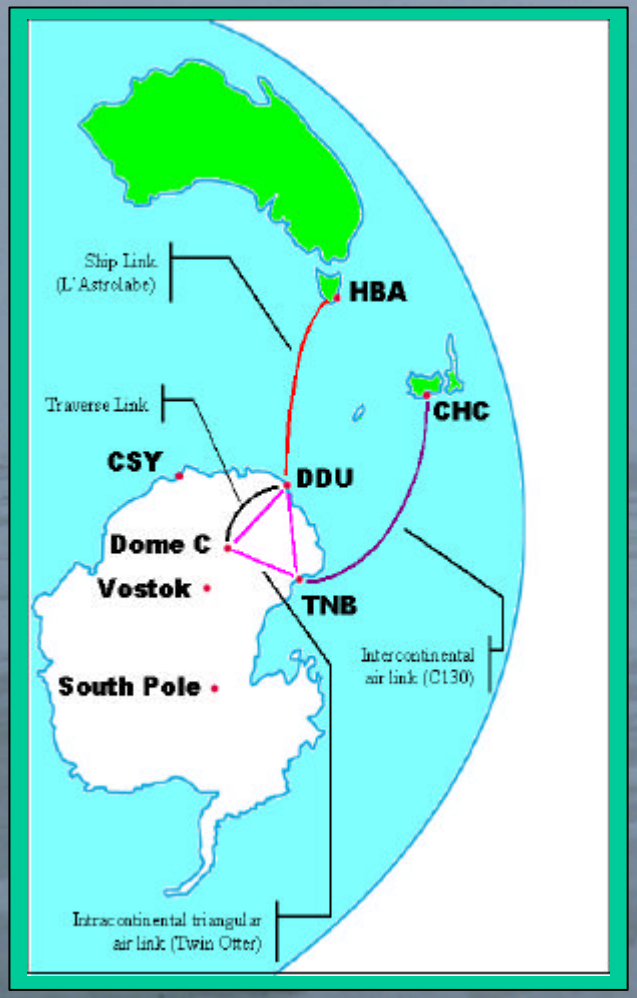
- Glaciology: 3,200m ice layer – 500,000 years
- Ozone hole: Inside polar vortex
- Astronomy: cold, dry, rarefied atmosphere
- Solid Earth Geophysics: far from marine perturbations
- Magnetism: 3,200m above continental crust
- Space Analogy

The Dome C Site

- 75°06’ South – 123°23’ East
- 3,200 m altitude
- Sub-horizontal ice ground with no crevasses
- No local fauna or flora

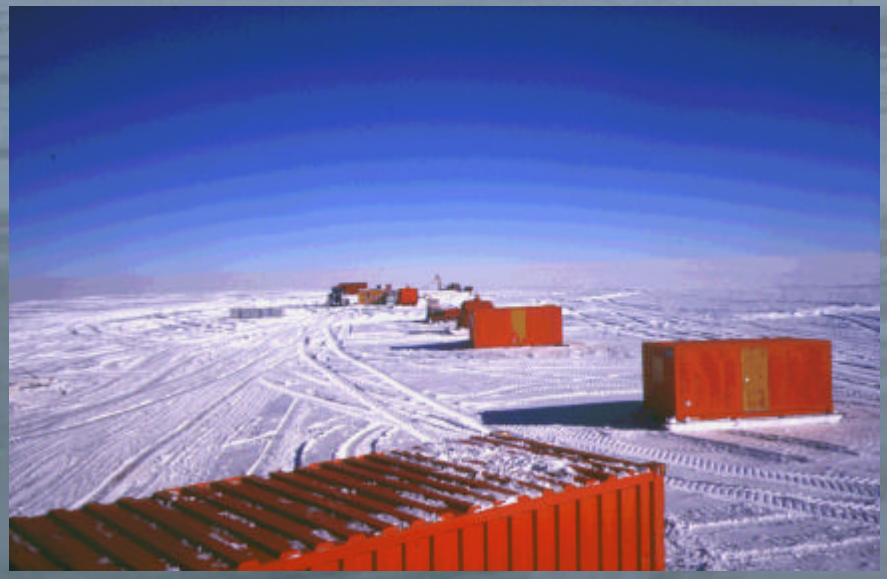
The Dome C Site

- 950 km inland from Banzare Coast
- Closest station:
  Vostok (Russia) 560 km
- Closest coastal stations:
  Dumont d'Urville (France)
  and Casey (Australia) 1,100 km
  Terra Nova Bay (Italy) 1,200 km



The Dome C Site

- Low wind speeds: average 2.8 m/s (5.4 knots)
- Low precipitations
- Low temperatures:
  average -50.7°C (-59.3°F)
  minimum -84.6° (-120.3°F)
  summer -30°C (-22°F)
  winter -60°C (-76°F)
  (AWS – 14 years)



Surface Transport System

- Construction: 2,000 tonnes
- Annual resupply: 300 tonnes
- Need for reliable, cost effective cargo transport
- Development of long-range “traverse transport” system out of Dumont d’Urville (2,200 km return)
- Shipping to Dumont d’Urville from Hobart

Traverses

- Scientific vs Logistic traverses
- New generation of logistic traverses
- Now three return trips November-February
- 22-24 days to deliver 130 tonnes net cargo using 70 to 80 m3 of diesel fuel
- 250 km Coastal Zone at 6.5 km/h
  850 km Plateau Zone at 9.5 to 11 km/h

Cape Prud'homme Convoy Support Base

Typical Convoy

- 7 Caterpillar Challenger Tractors
- 2 Kassbohrer PB330 Tractors
- Tank sleds
- Caravans
- Trailers and Sleds

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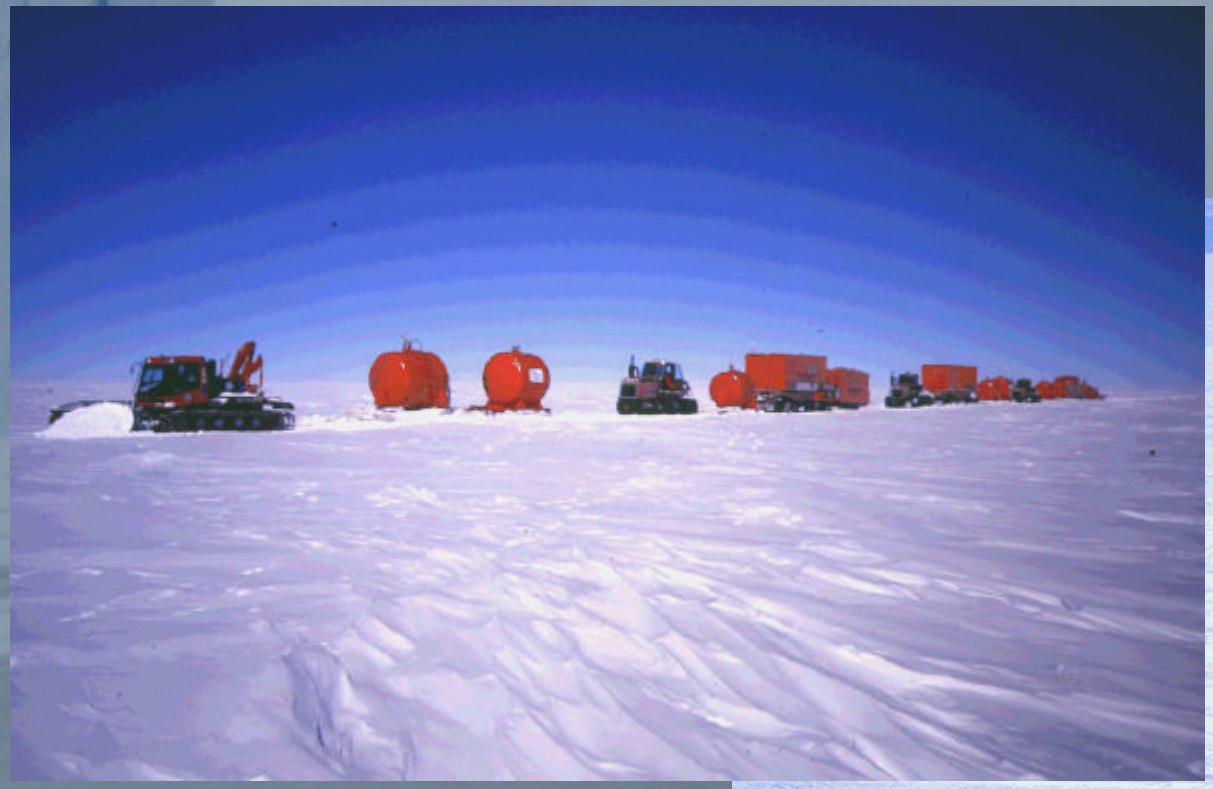
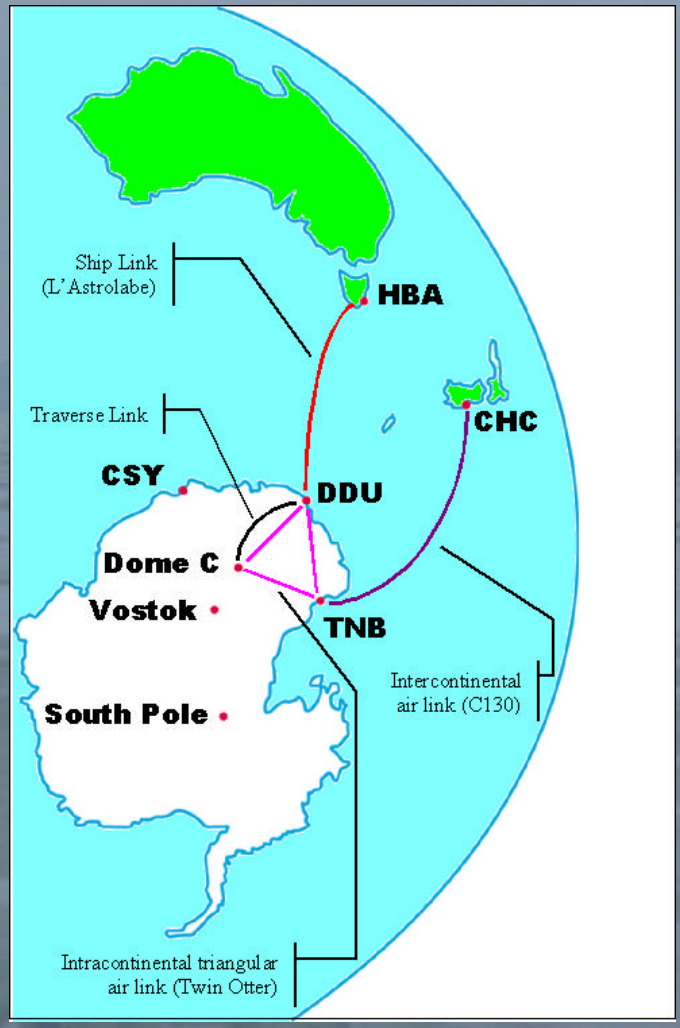


Light Plane Transport

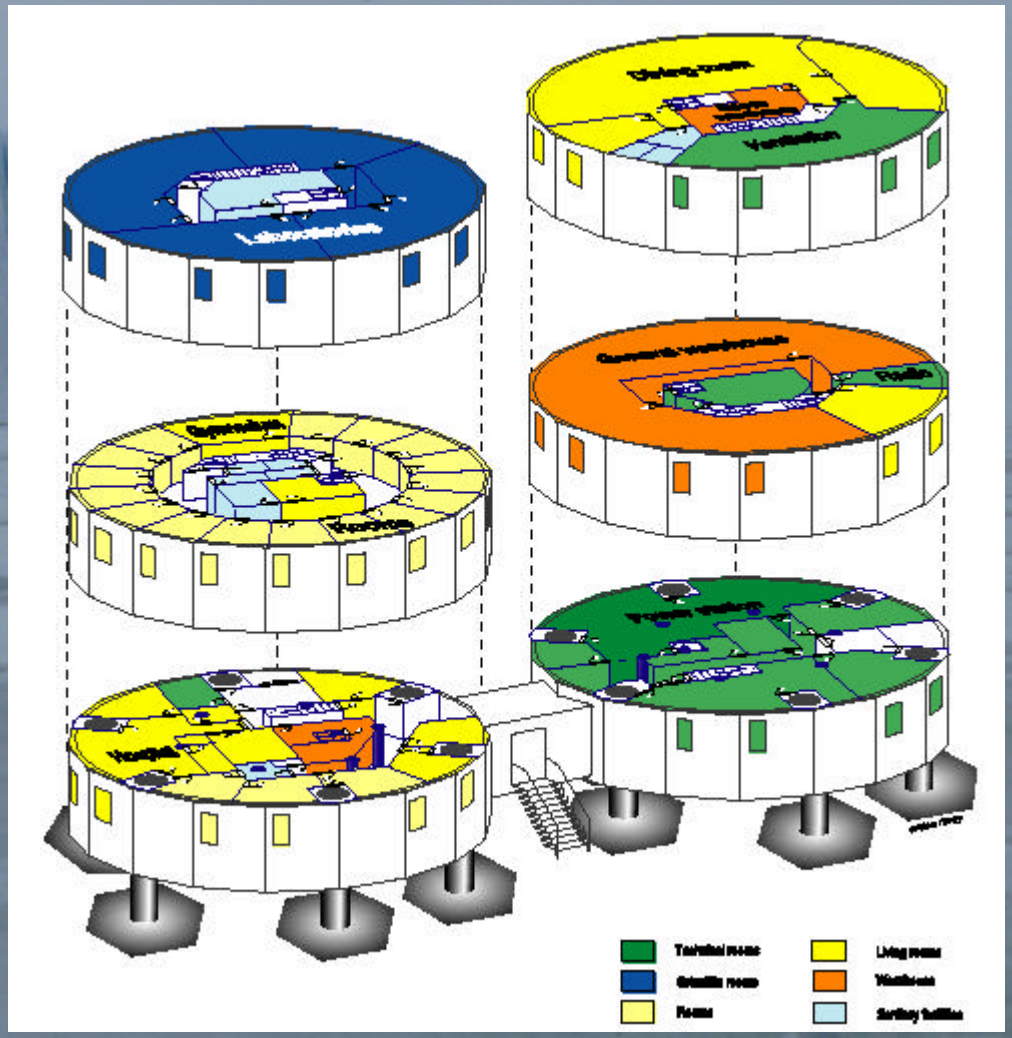
- Twin Otter TNB-DC-DDU
- Passengers and light cargo
- 3,000m levelled snow runway
- 40 flights per season



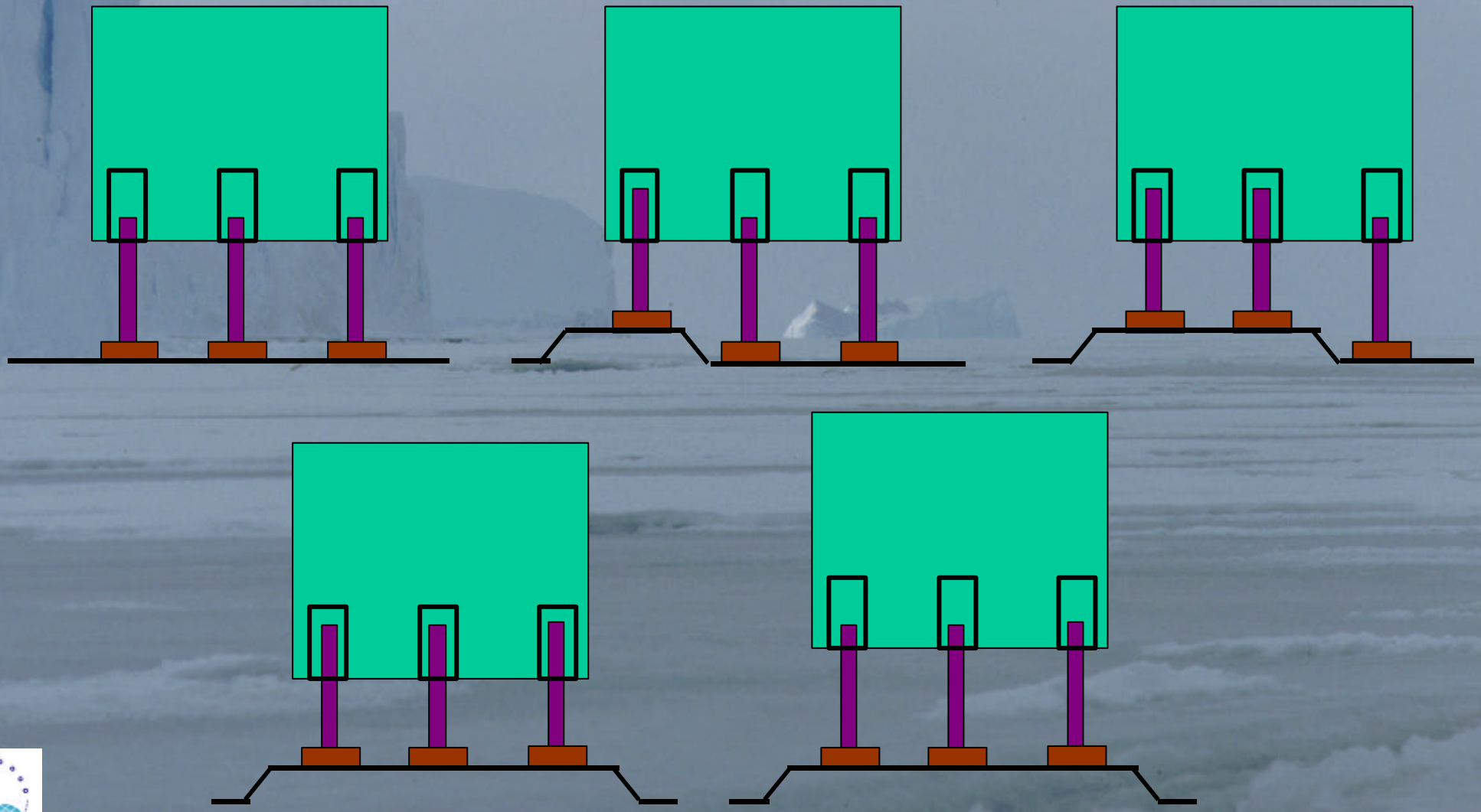
Building Design Concept

- Core of 3 ‘winter’ buildings and summer camp
- Winter buildings:
  2 cylindrical ‘integral self-elevating’ buildings
  1 modular powerhouse on skis
- Summer camp:
  modules on skis
  used as emergency station in winter

Winter Buildings



‘integral self-elevating buildings’



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Strong building frame

Concordia – Conclusion

- Year-round international research support facility high on the Antarctic ice cap
- Integral self-elevating buildings
- New generation of logistic traverses
- Open for summer operation since 1997
- Open year round from 2003?