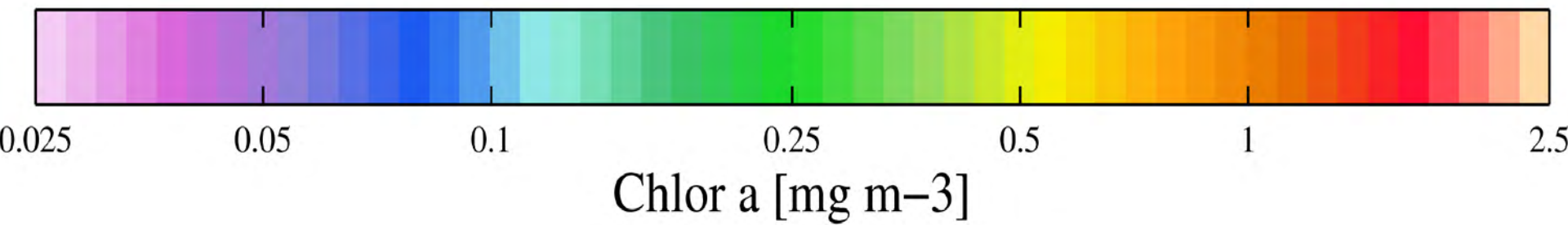
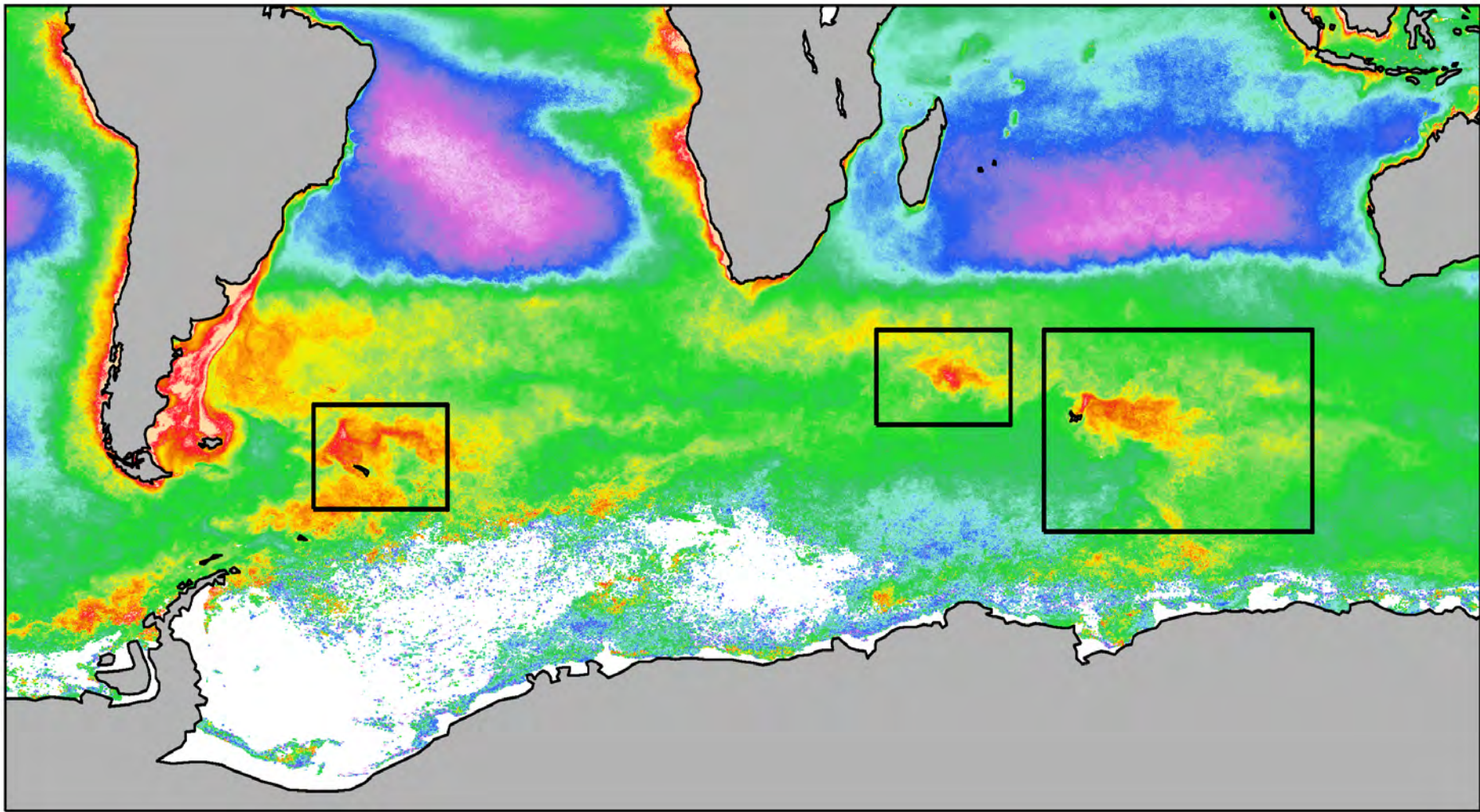


A tale of three islands: downstream natural iron fertilization in the Southern Ocean

JOSIE ROBINSON

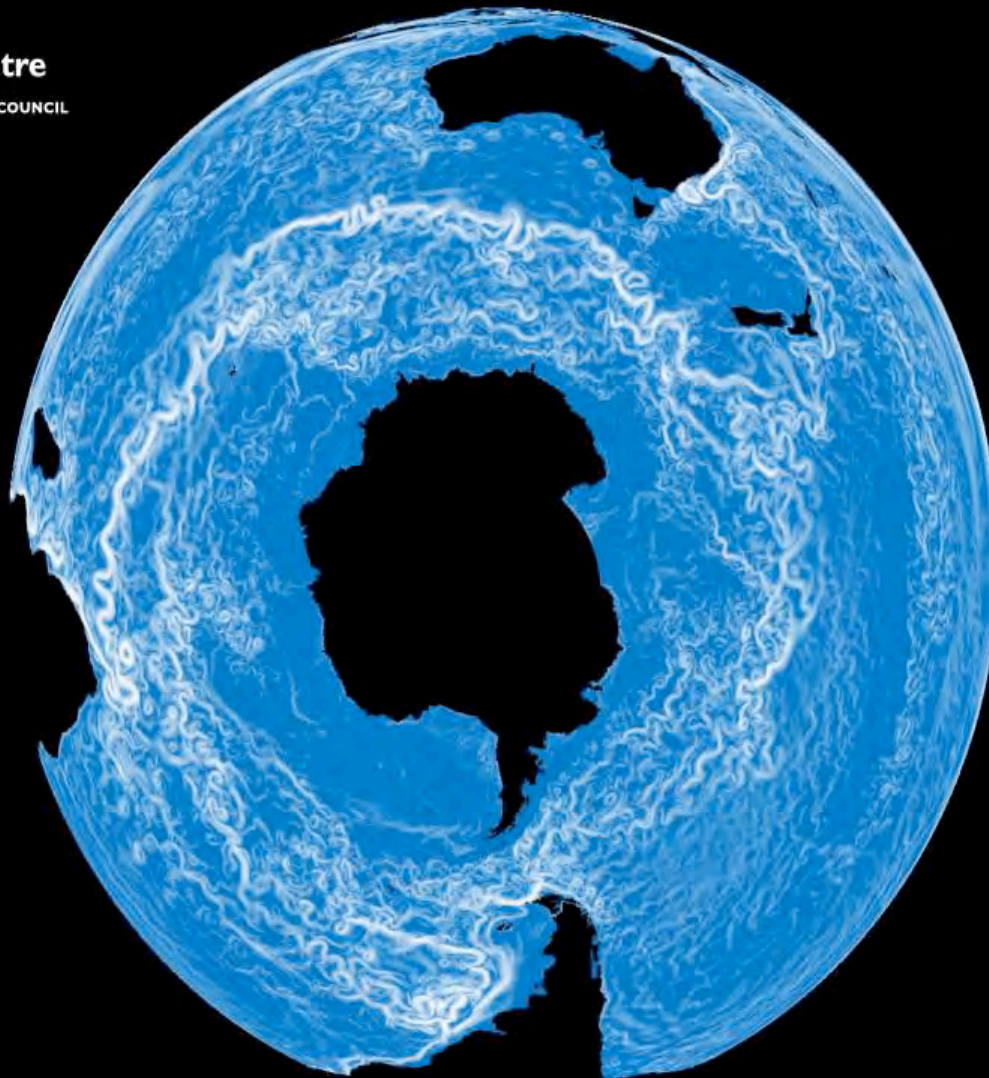
EKATERINA POPOVA, MERIC SROKOSZ, ANDREW YOOL







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NERC SCIENCE OF THE
ENVIRONMENT

Can advection explain the
extent of the blooms?

Can advection explain the
bloom inter-annual variability?



Kerguelen Plateau

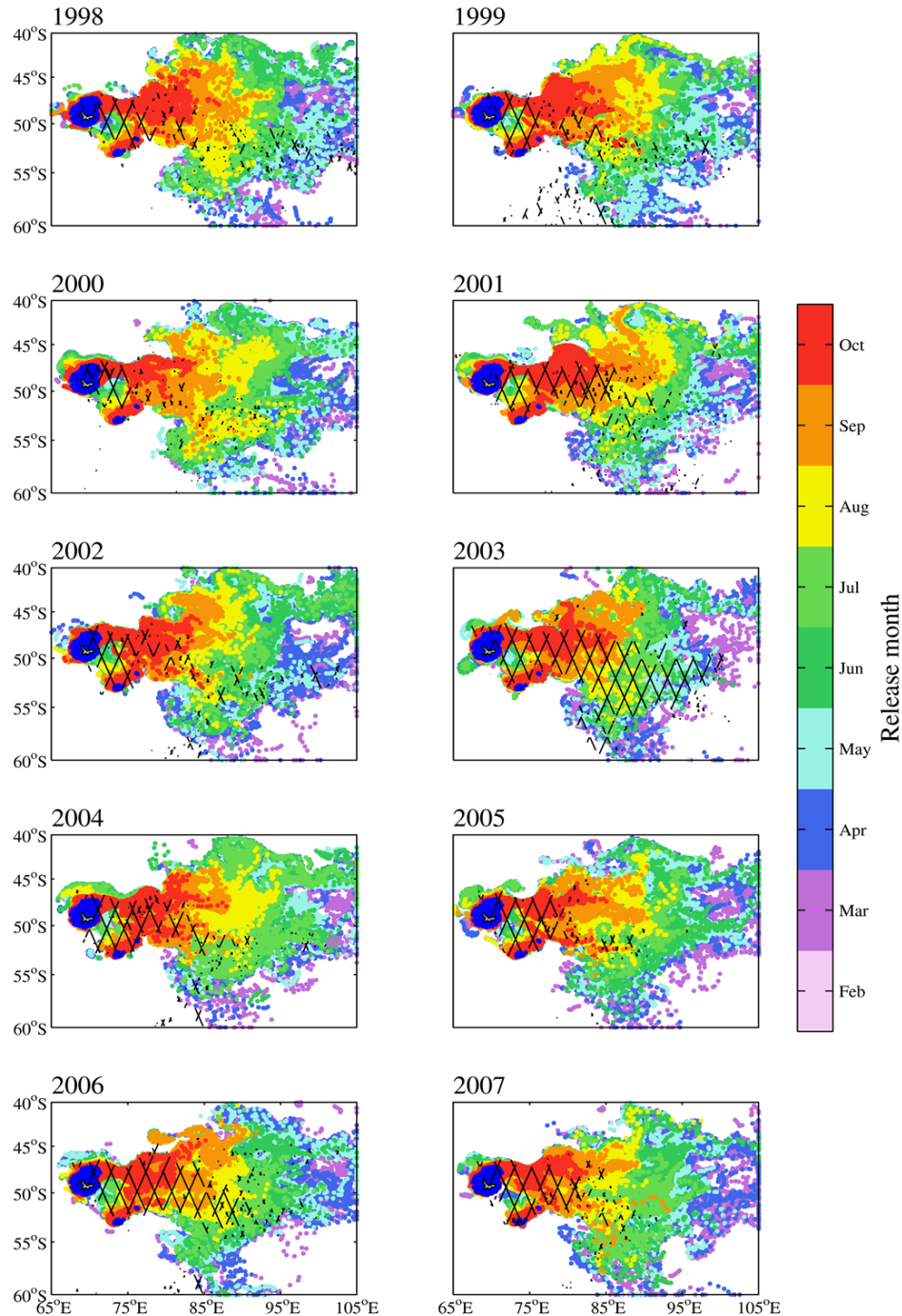
Typical bloom period is Nov – Jan

Can advection explain the extent of the blooms?

- The area that could be fertilised with iron by advection from the island is overlapping the area of the bloom

Can advection explain the bloom inter-annual variability?

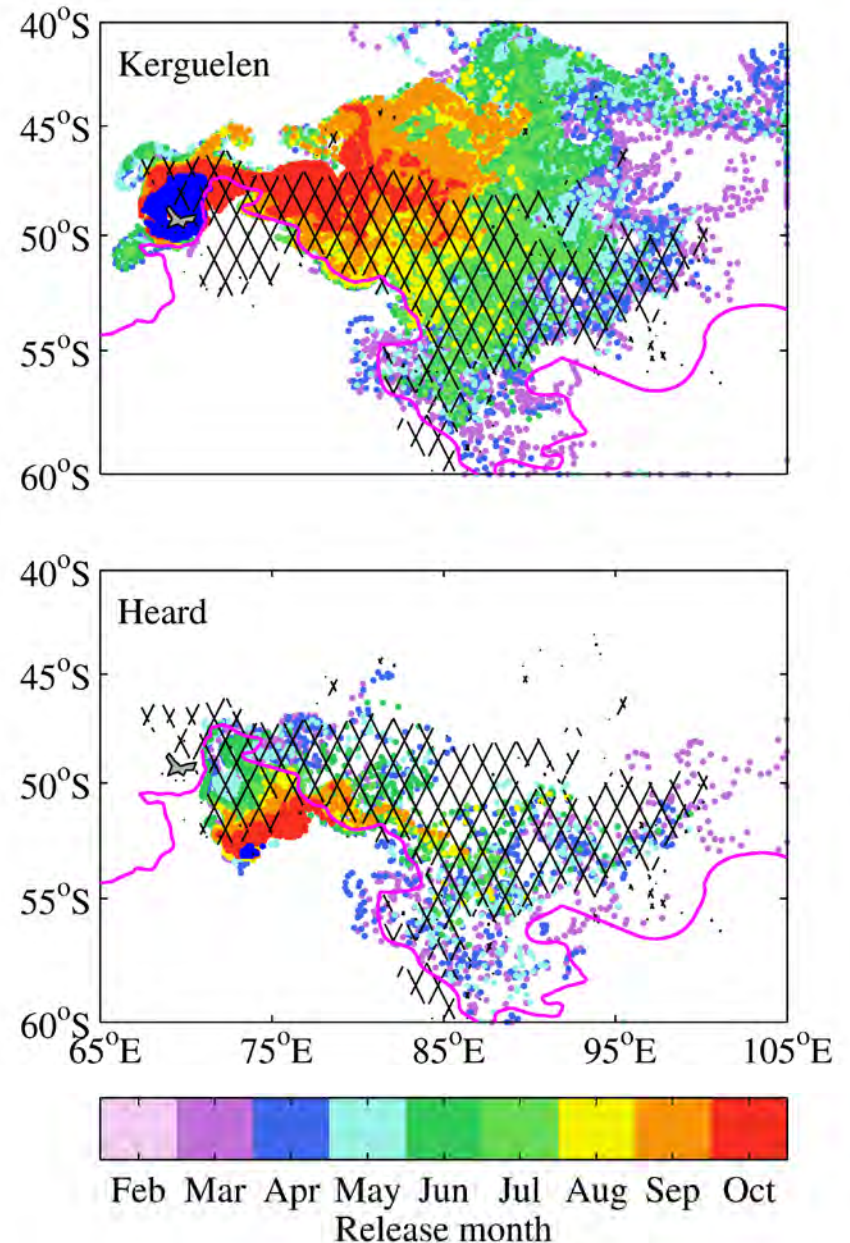
- Fertilised area is consistent year on year, generally speaking the pattern of advection is very similar in area and timing



Kerguelen Plateau

Separate Kerguelen vs. Heard starting particles

- Kerguelen island: fertilises the off shore bloom (trajectories kept off the south plateau by the location of the Polar Front)
- Heard island: fertilises the bloom occurring over the plateau (few trajectories can cross the Polar Front into the off-shore bloom area)
- Most in-situ observations for the Kerguelen bloom is on the plateau



Crozet Island

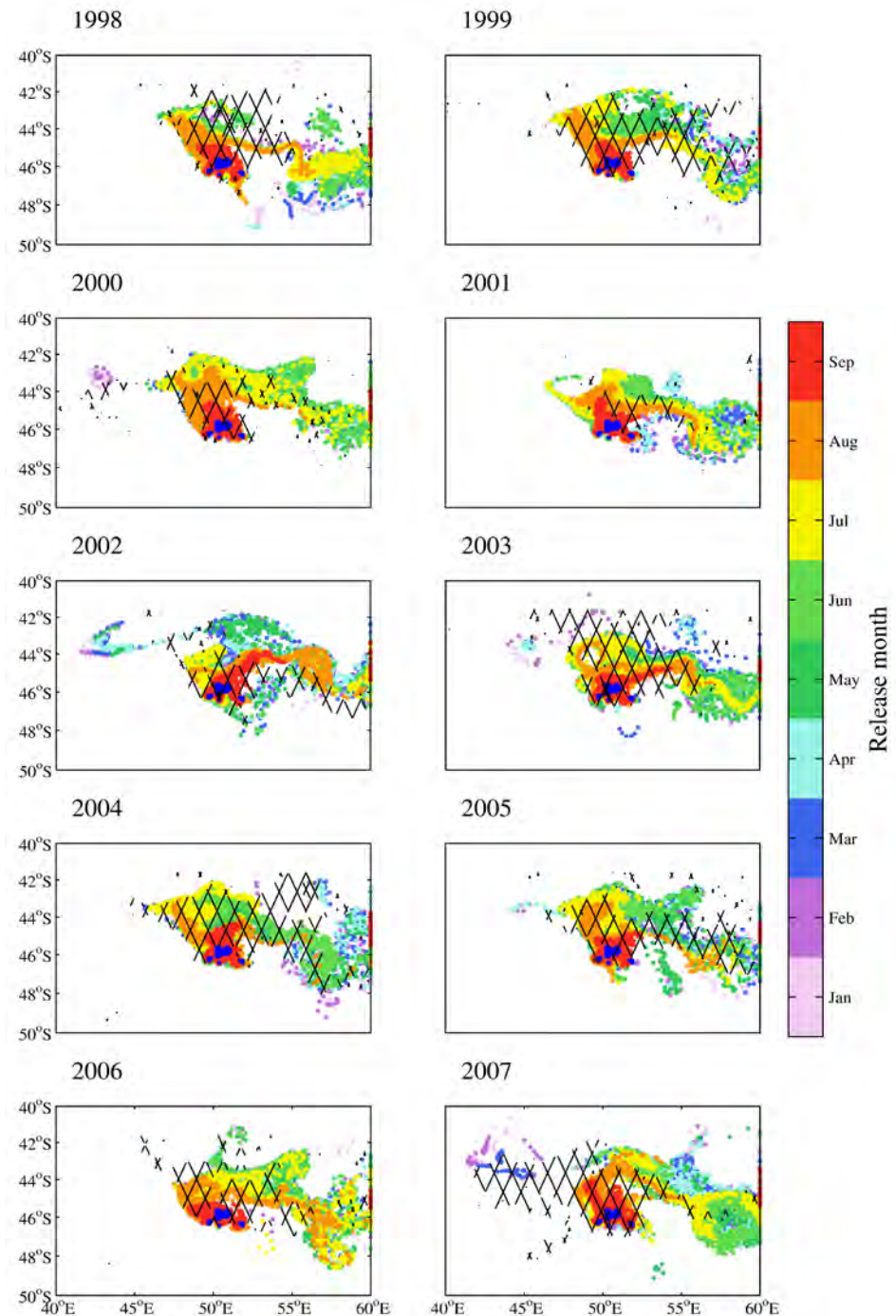
Typical bloom period is Oct – Dec

Can advection explain the extent of the blooms?

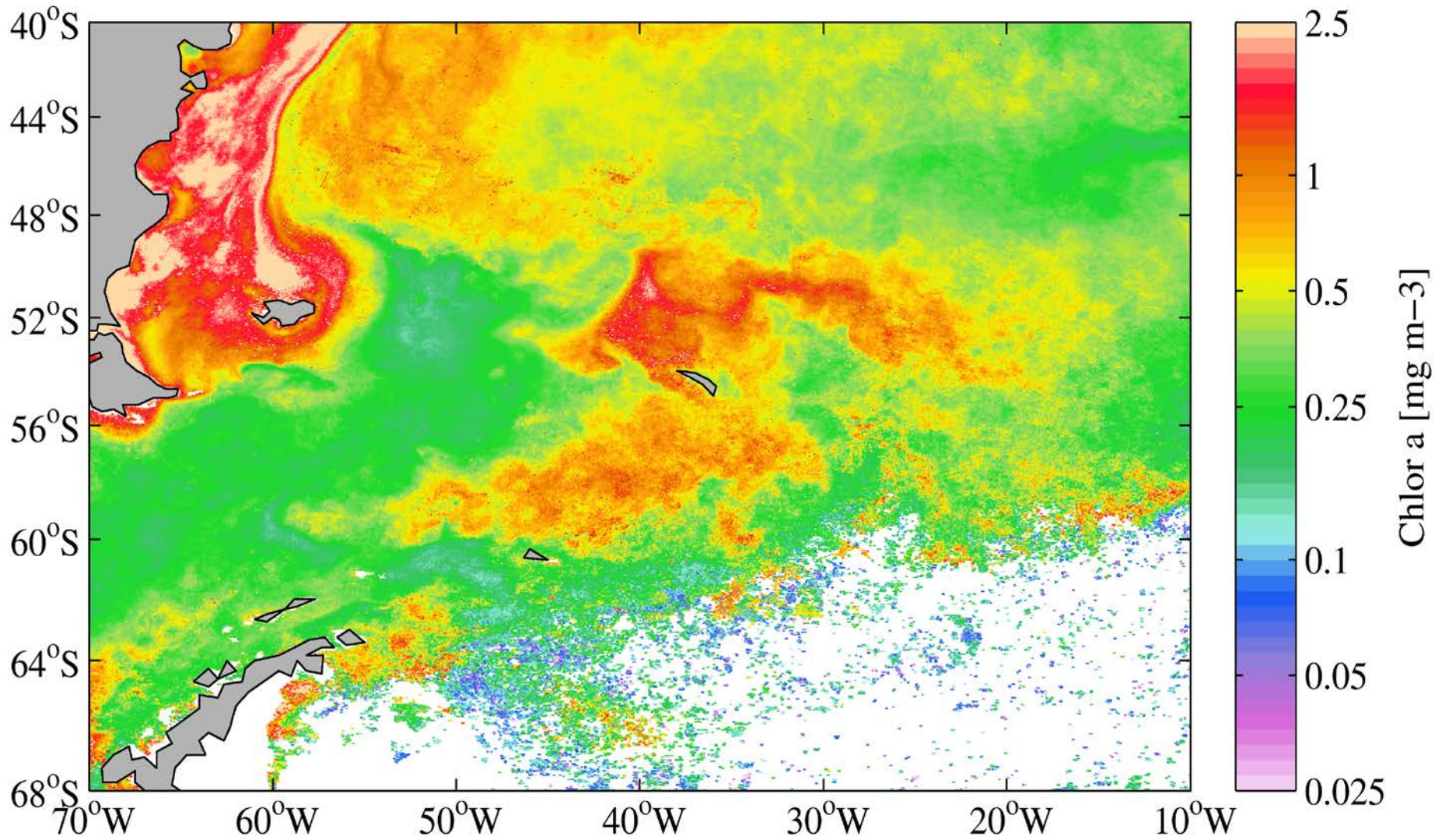
- The area that could be fertilised with iron by advection generally overlaps the bloom
- Both bloom and fertilised patch predominately north eastwards of the island, with the occasional propagation to the west

Can advection explain the bloom inter-annual variability?

- Fertilised area is just as variable as the bloom



South Georgia



South Georgia

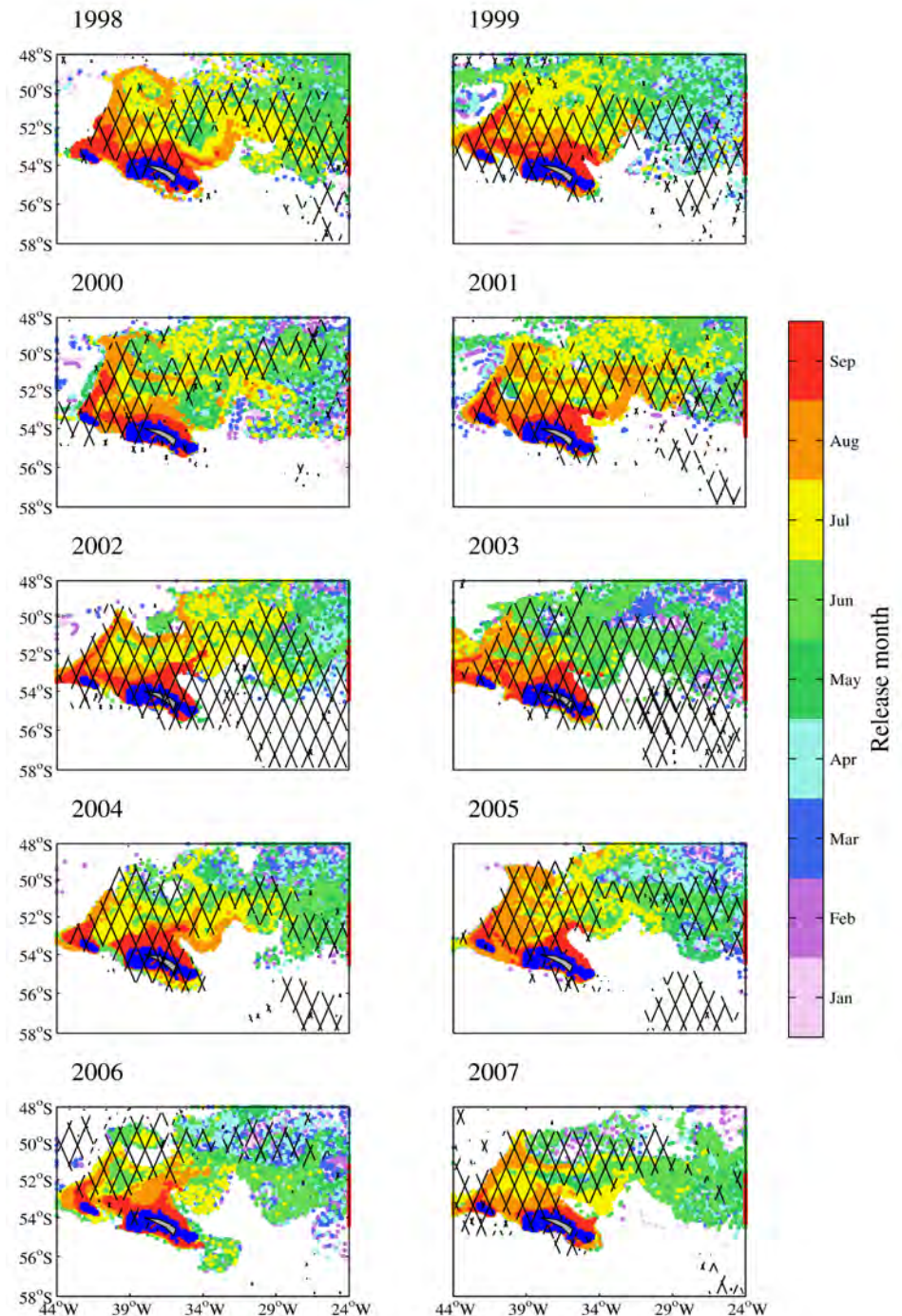
Typical bloom period is Oct – Apr

Can advection explain the extent of the blooms?

- The fertilised area overlaps part of the bloom in this region
- Both bloom and fertilised patch to the north and east of the island

Can advection explain the bloom inter-annual variability?

- High degree of variability in the timing of fertilisation – distance travelled by each monthly releases



Conclusions

Can advection explain the extent of the bloom?

- Yes, the advection seen in the model covered most parts of the bloom area for both Kerguelen and Crozet
- The advection overlapped the bloom occurring north east of South Georgia – however “South Georgia bloom” is unclear

Can advection explain the inter-annual variability?

- Kerguelen – no, advective fertilisation is consistent year on year
- Crozet – yes, advection shows a similar degree of spatial variability to the bloom
- South Georgia – maybe, there is temporal variability in the advection

Any questions?

