FINE SCALE POPULATION STRUCTURE OF BOTTLENOSE DOLPHINS (*Tursiops truncatus*) OFF GALICIAN WATERS, NW SPAIN

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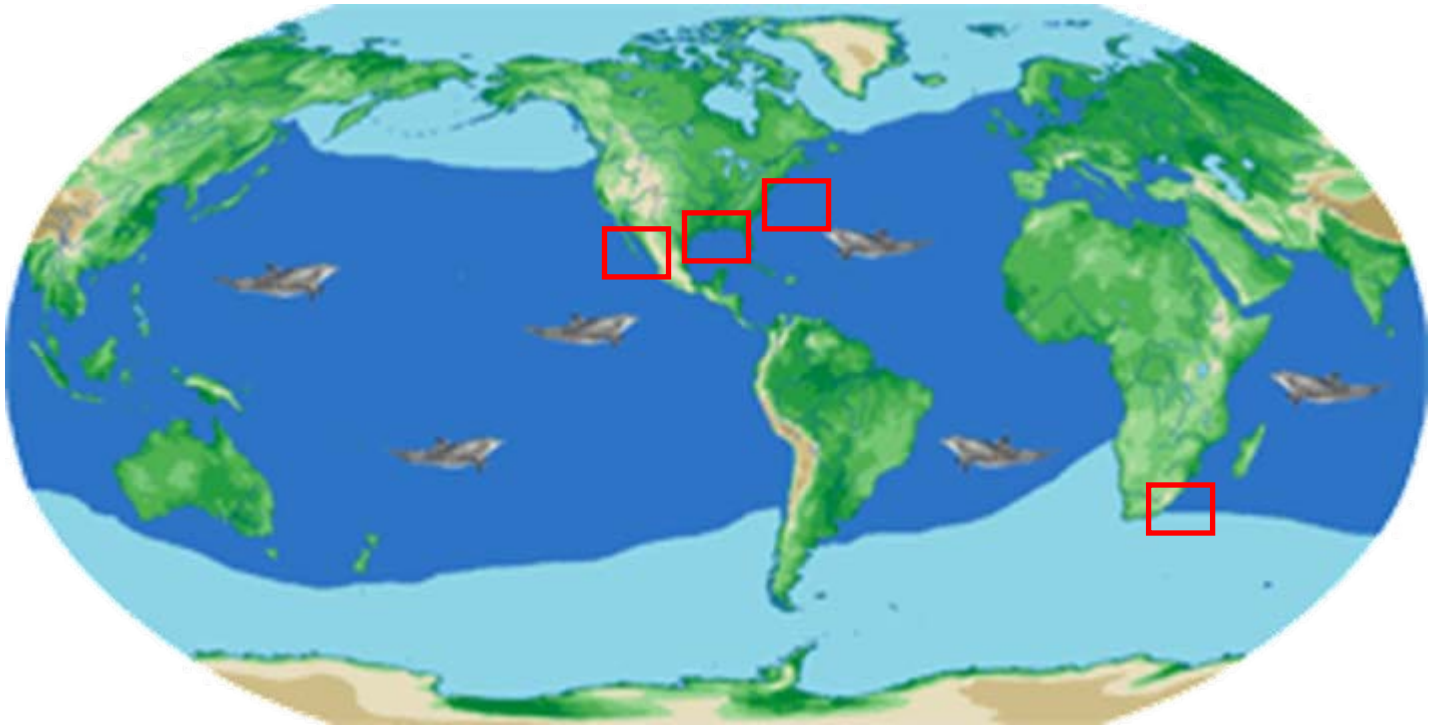
SUERC

Population structure of the Bottlenose dolphin

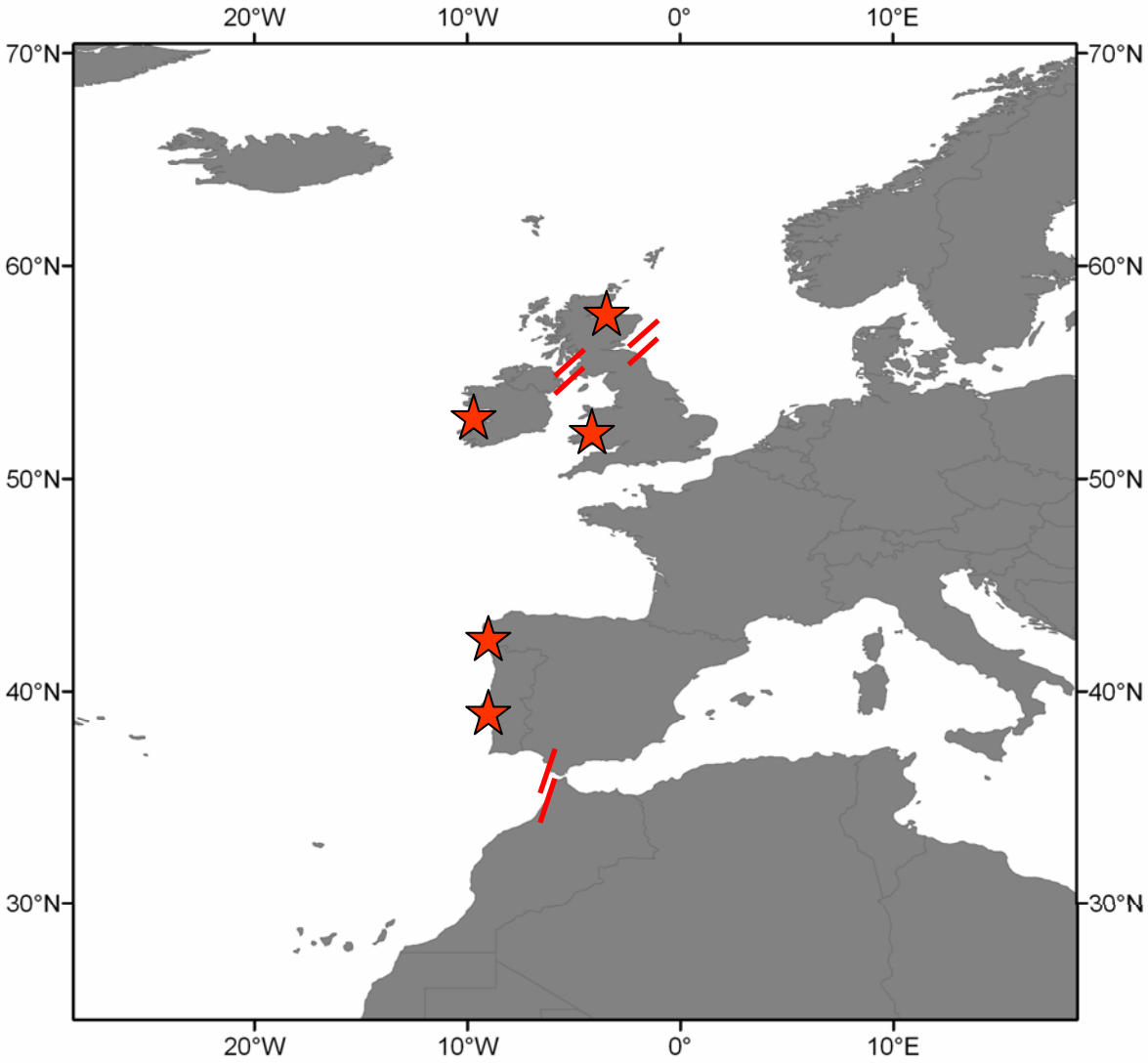
Worldwide distribution: coastal and open waters



Pelagic populations **high** levels of genetic diversity

Coastal populations **low** levels of genetic diversity

Offshore and coastal populations



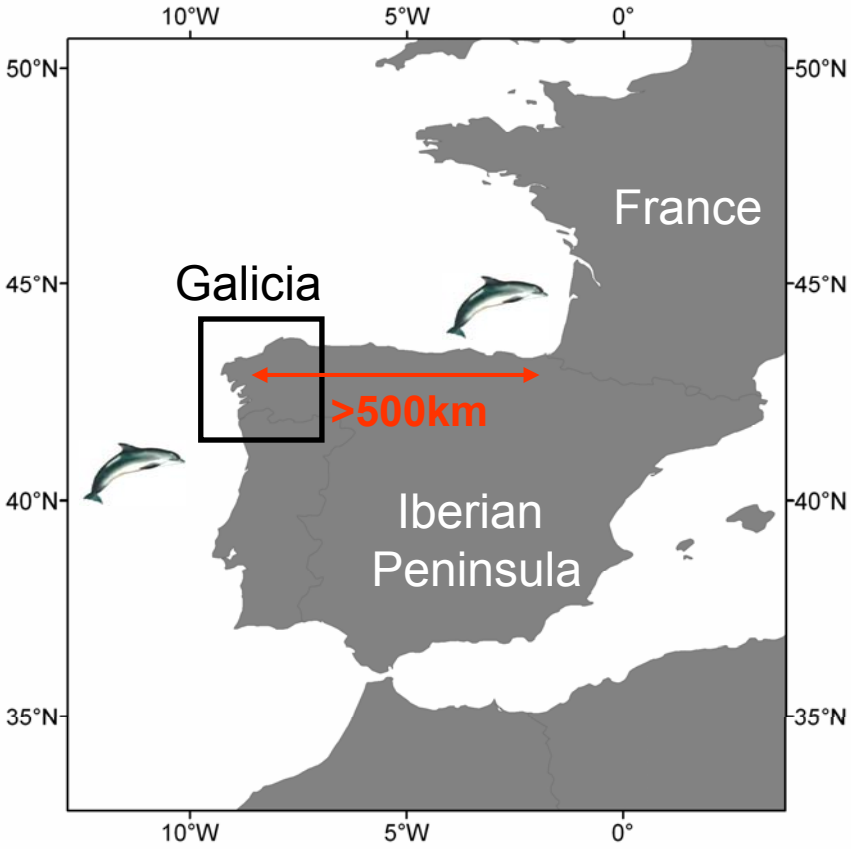
European Coastal Resident populations

Management implications

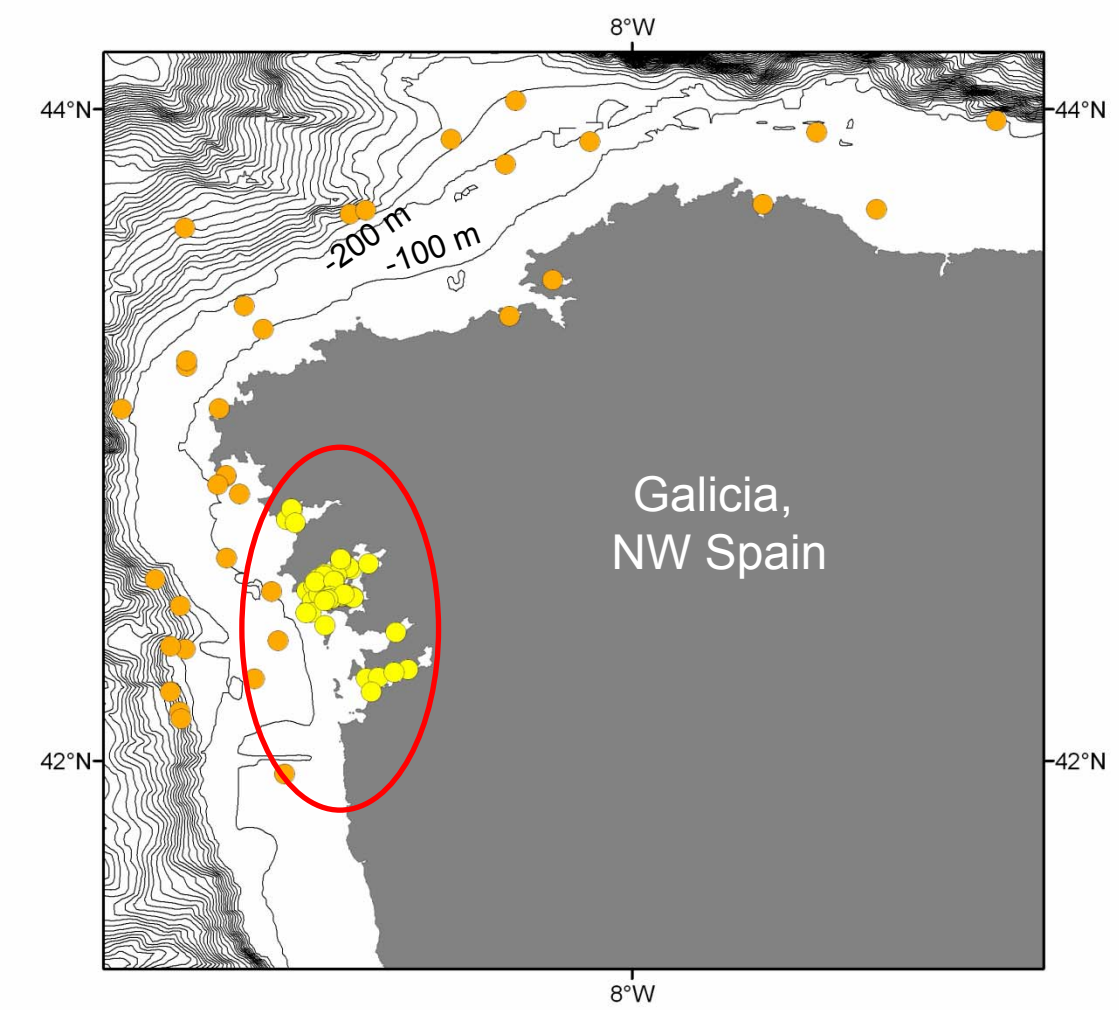
Habitats Directive SACs

Most common cetacean species in Galician coastal waters

Unclear population movements



Coastal sightings (resident) vs. offshore sightings



Population structure

- Genetics: 10 microsatellite loci, N = 33 (1994 - 2008)
  Skin
- Stable isotope analyses: $\delta^{15}N$ and $\delta^{13}C$, N = 38 (1998 - 2007)
  Skin and muscle of adults and juveniles

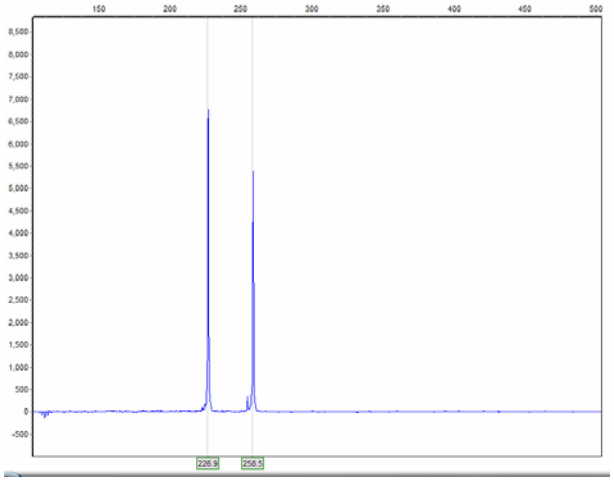
10 microsatellite loci

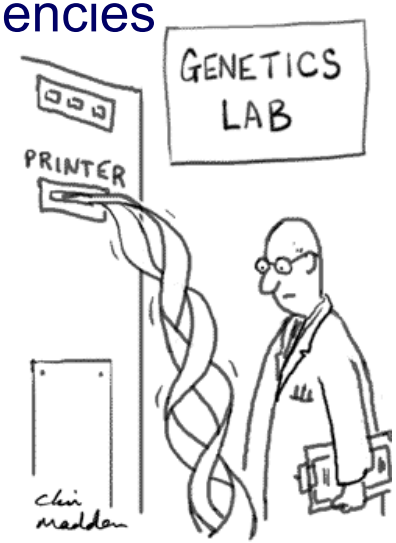
- Polymorphic sites in nuclear DNA

- Repeats of groups of 2-6 base pairs (nucleotides) e.g. $(CTAT)_n$

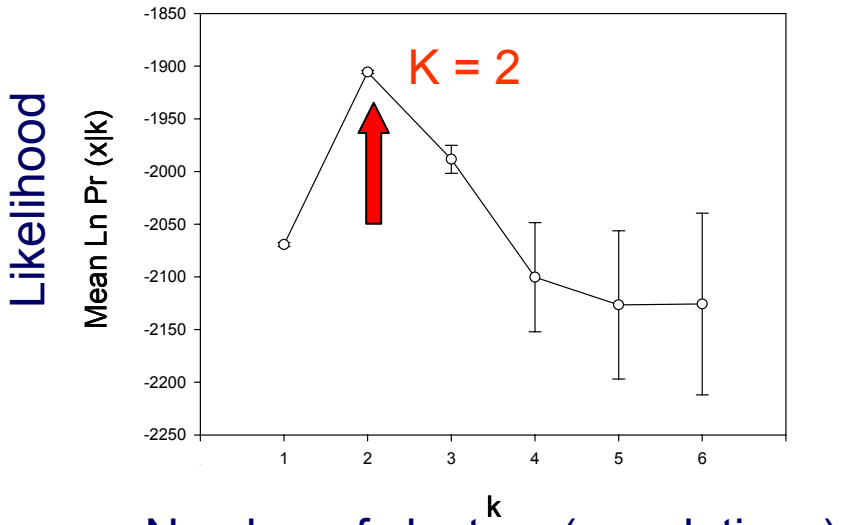
- Individuals characterized by different number of repeats (different n_s: alleles)

- Different populations – Different allele frequencies

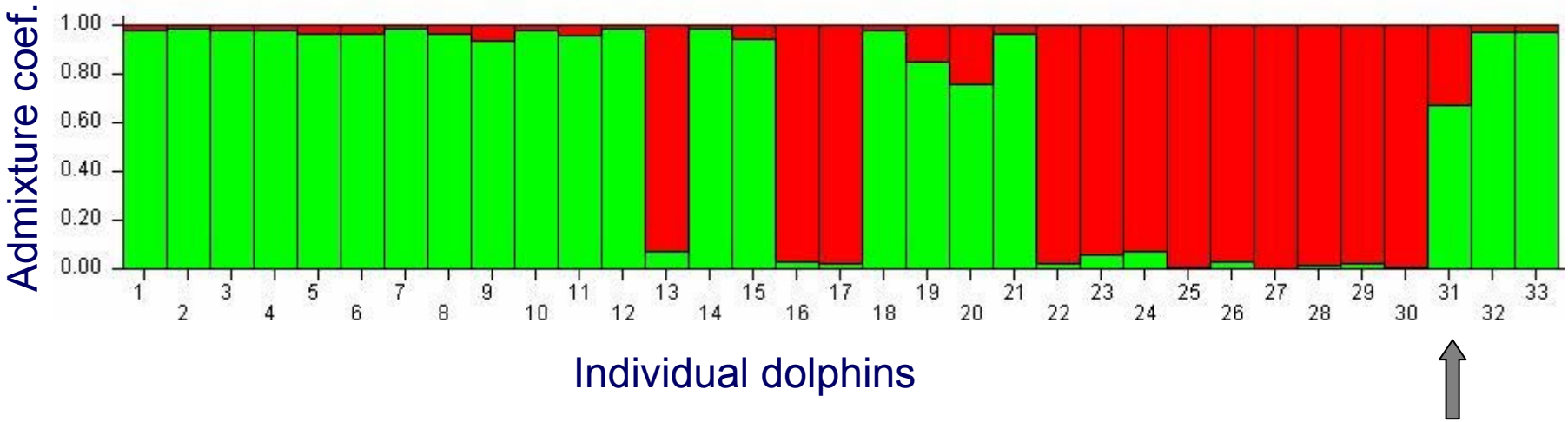




Population structure of the Bottlenose dolphin



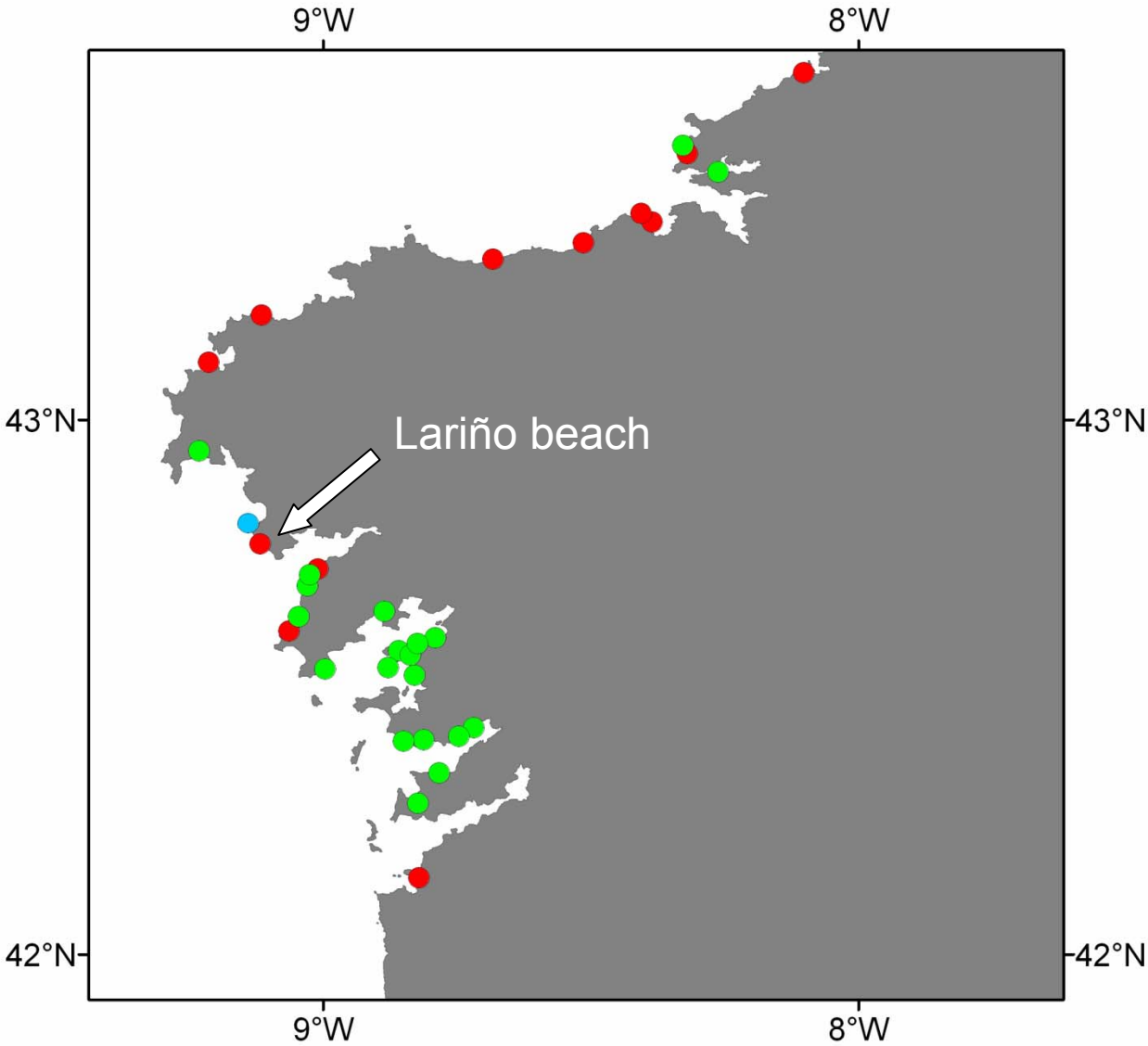
Number of clusters (populations)



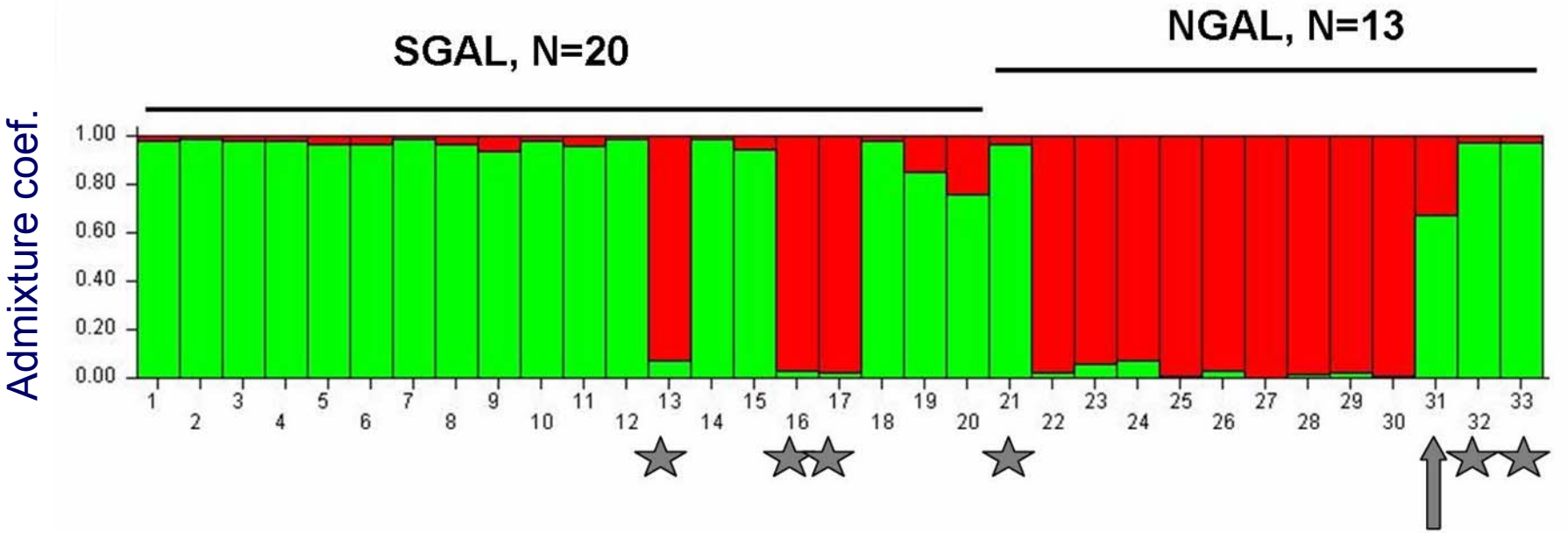
Individual dolphins

Stranding location of Dolphins genetically classified as

POP1: Green
POP2: Red



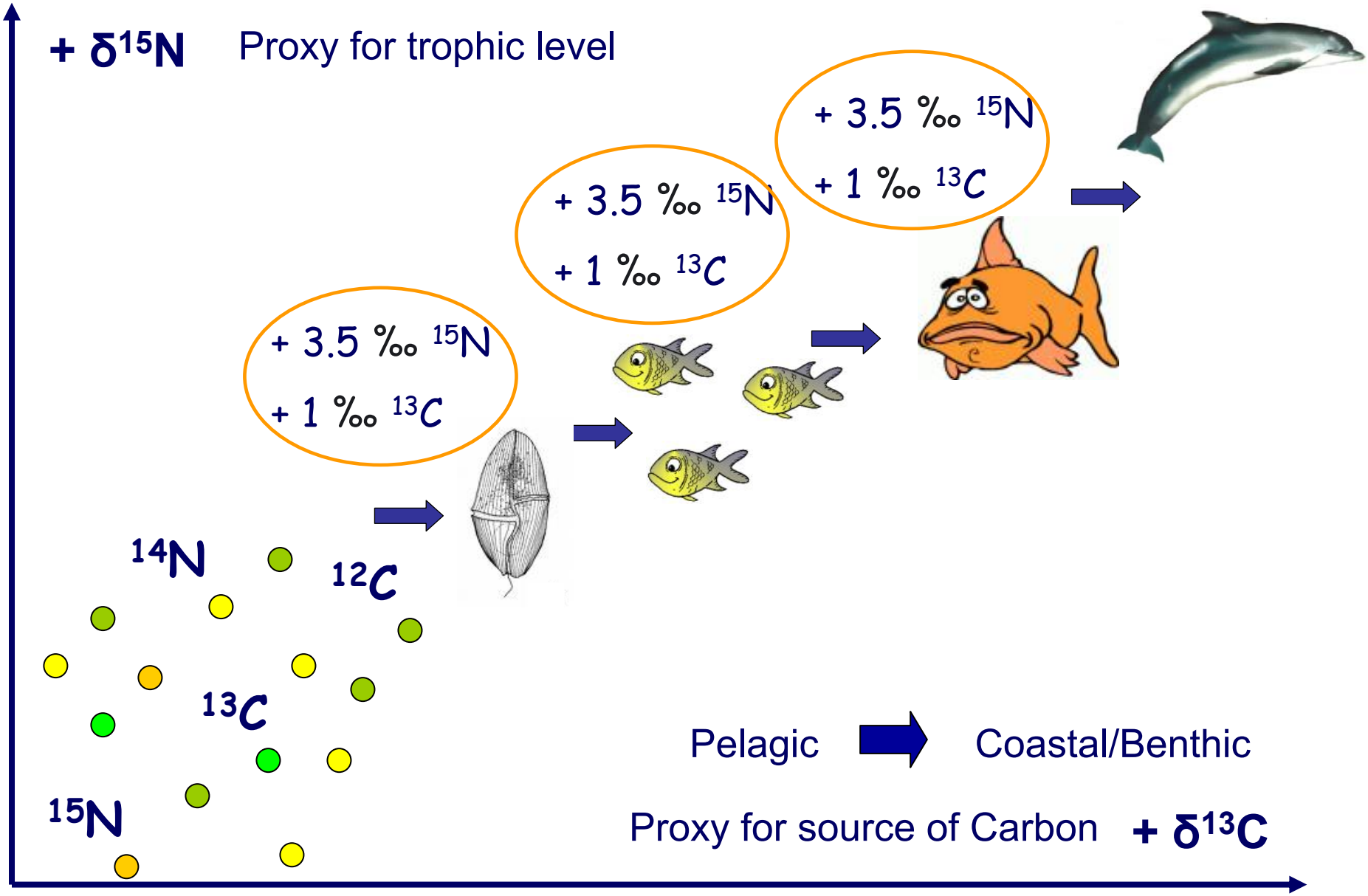
Population structure of the Bottlenose dolphin



★ Possible migrants

Genetic differentiation SGAL-NGAL

Fst = 0.064, p = 0.003

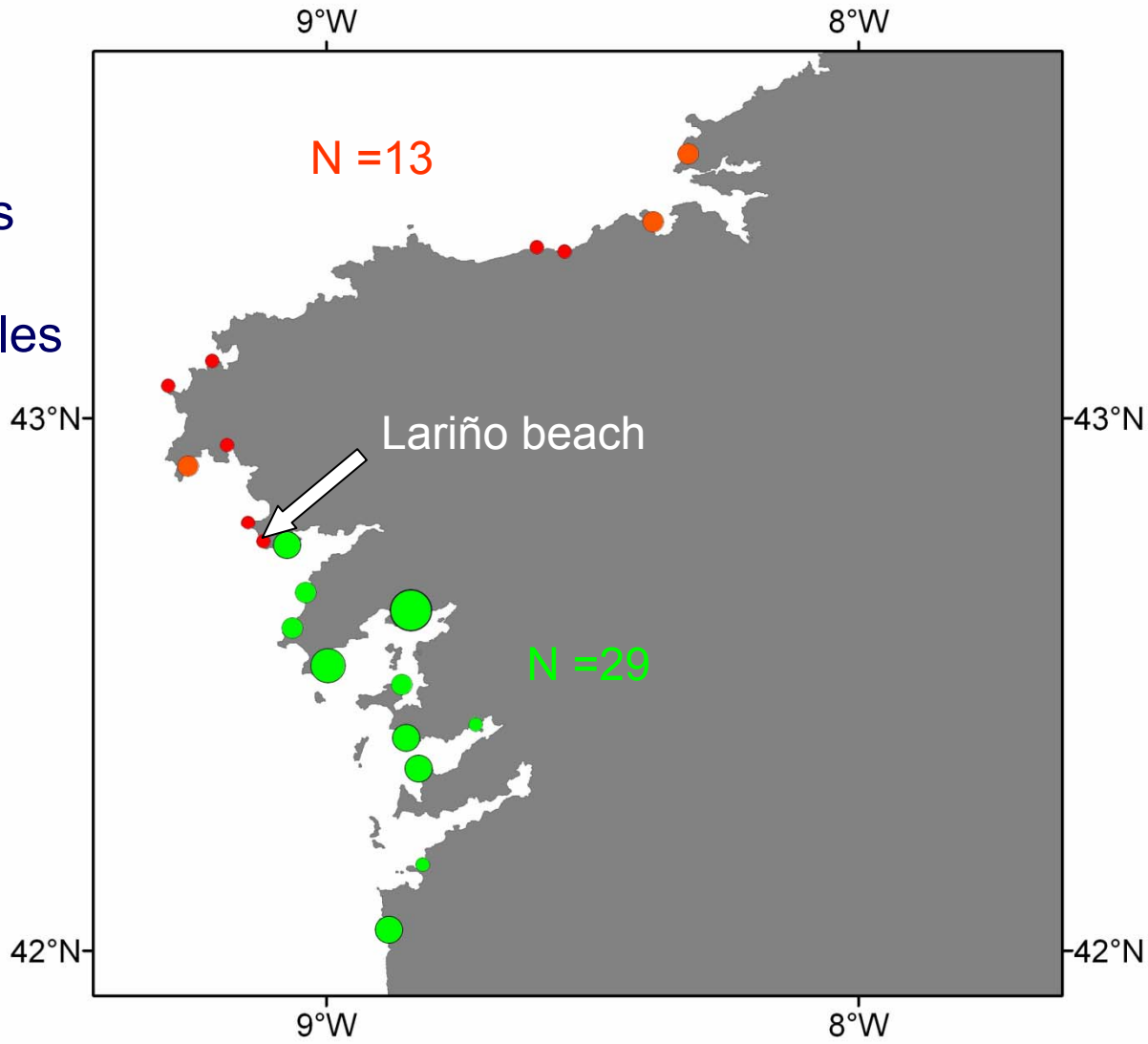

+ δ15N
Proxy for trophic level
+ 3.5 ‰ 15N
+ 1 ‰ 13C
+ 3.5 ‰ 15N
+ 1 ‰ 13C
+ 3.5 ‰ 15N
+ 1 ‰ 13C
14N
12C
13C
15N
Pelagic
Coastal/Benthic
Proxy for source of Carbon
+ δ13C

Stranding location of dolphins used for stable isotope analyses

Skin and muscle samples

Dolphins were ASSIGNED to Populations:

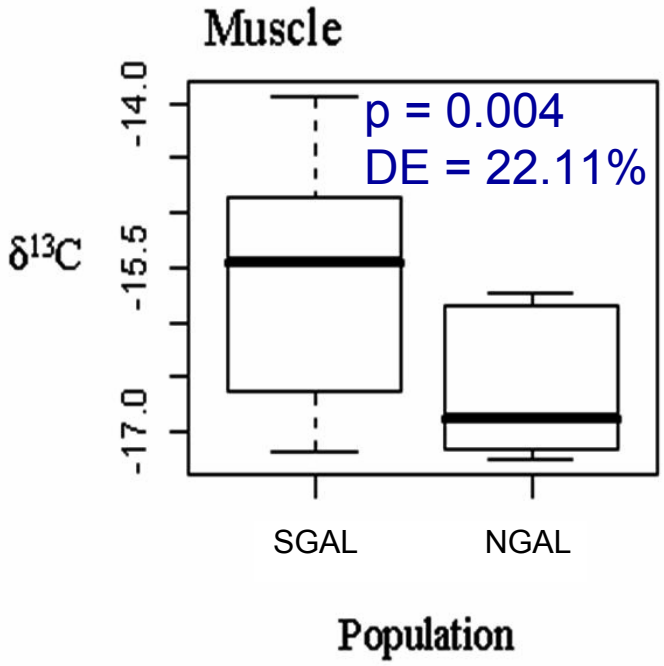
SGAL: Green
NGAL: Red



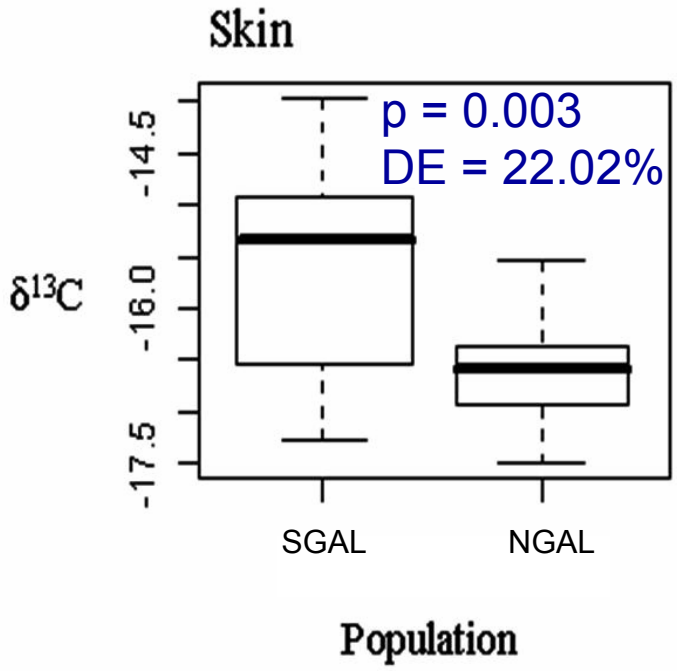
Factors: Length, Population, Sex, Quarter, Year, Cause of death

GLMs - GAMs

$\delta^{13}C$ **musc** ~ Population*



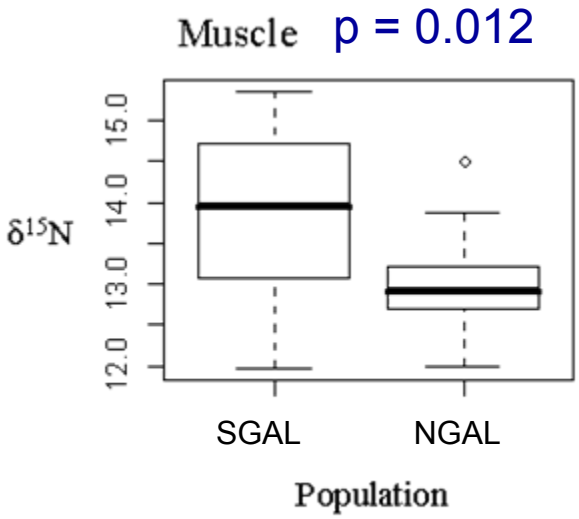
$\delta^{13}C$ **skin** ~ Population*

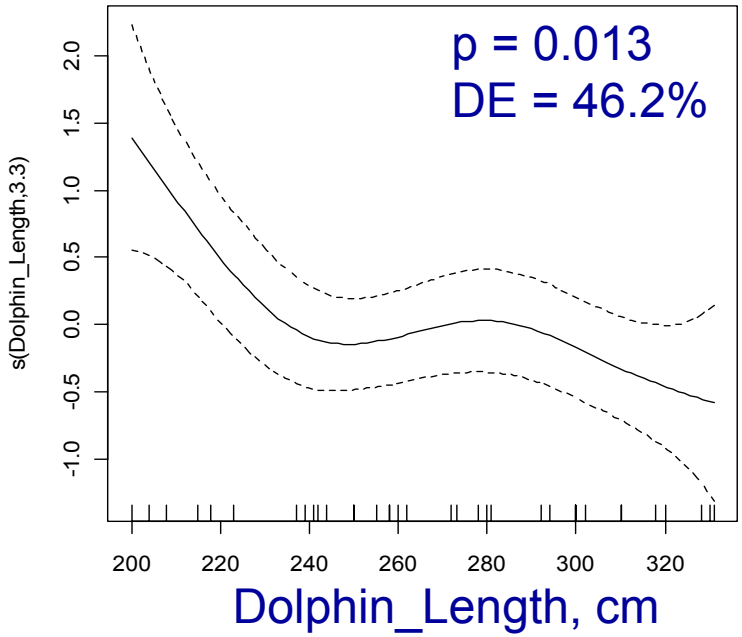


SGAL dolphins higher $\delta^{13}C$

Coastal vs. pelagic habitat

GAM: $\delta^{15}N$ **muscle** ~ Population* + Dolphin_Length*





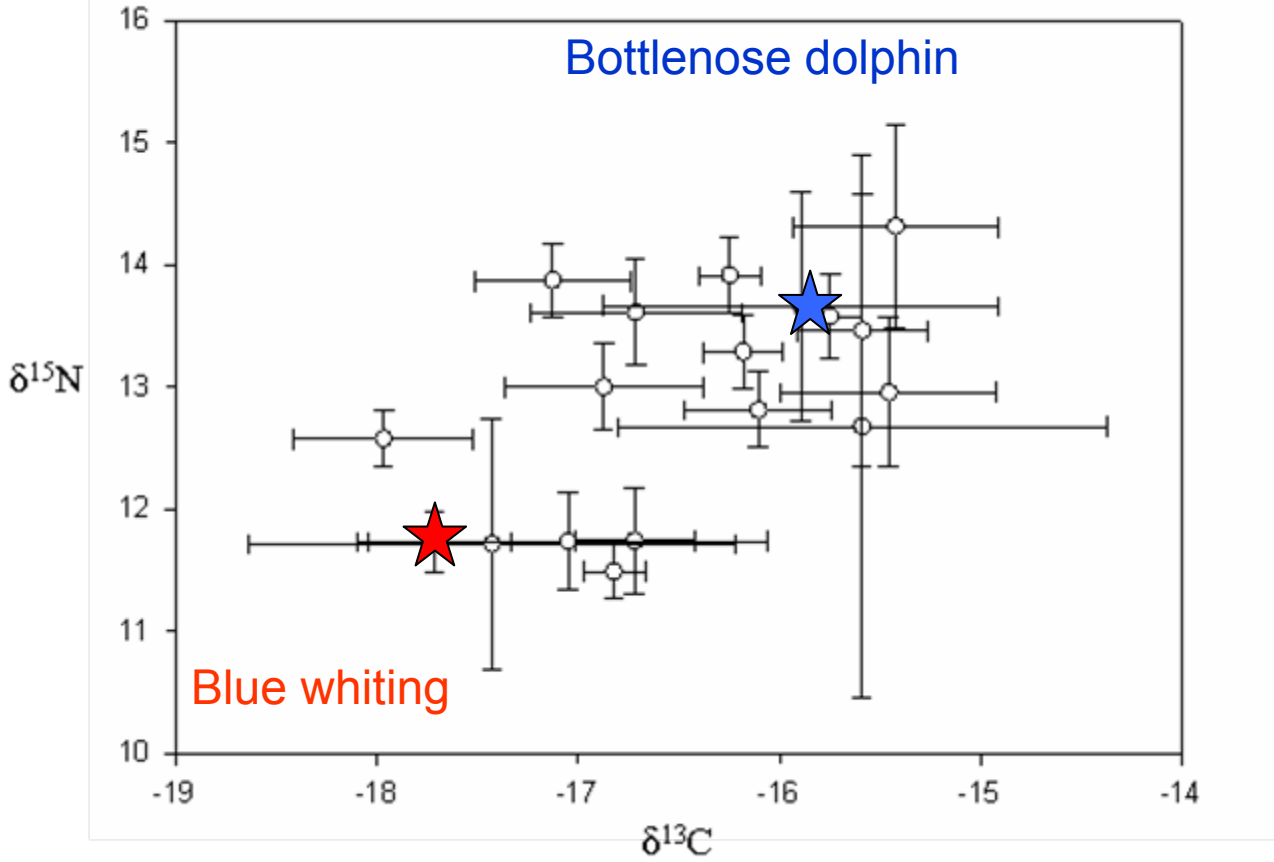
- SGAL dolphins higher δ15N

- Decreasing trophic level ($\delta^{15}N$) with increasing dolphin body size

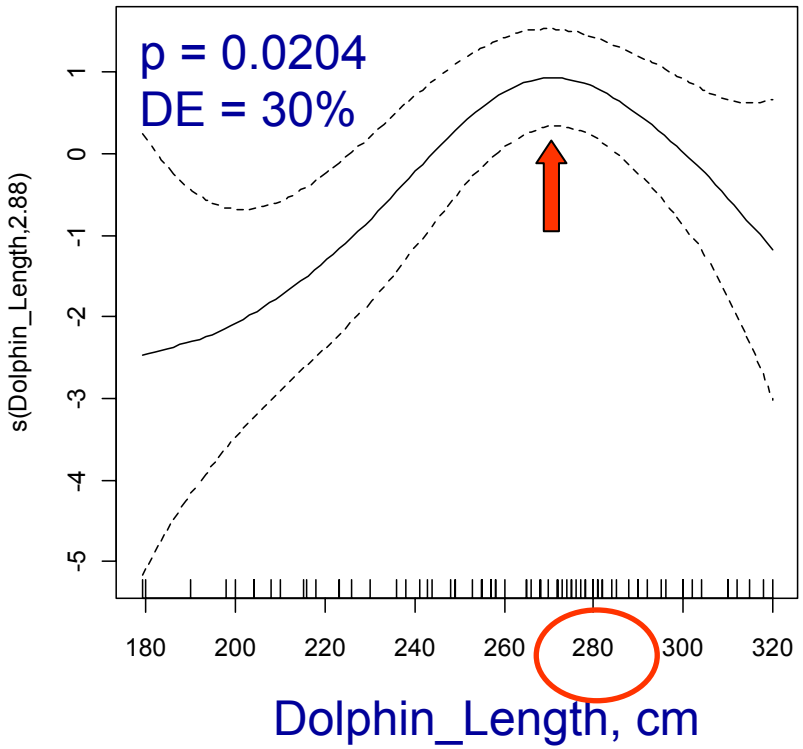
Blue whiting
Micromesistius poutassou

Blue whiting is the **main prey** species in Galicia (73% by number, 48% by weigth)

At a **low trophic level** in the food chain

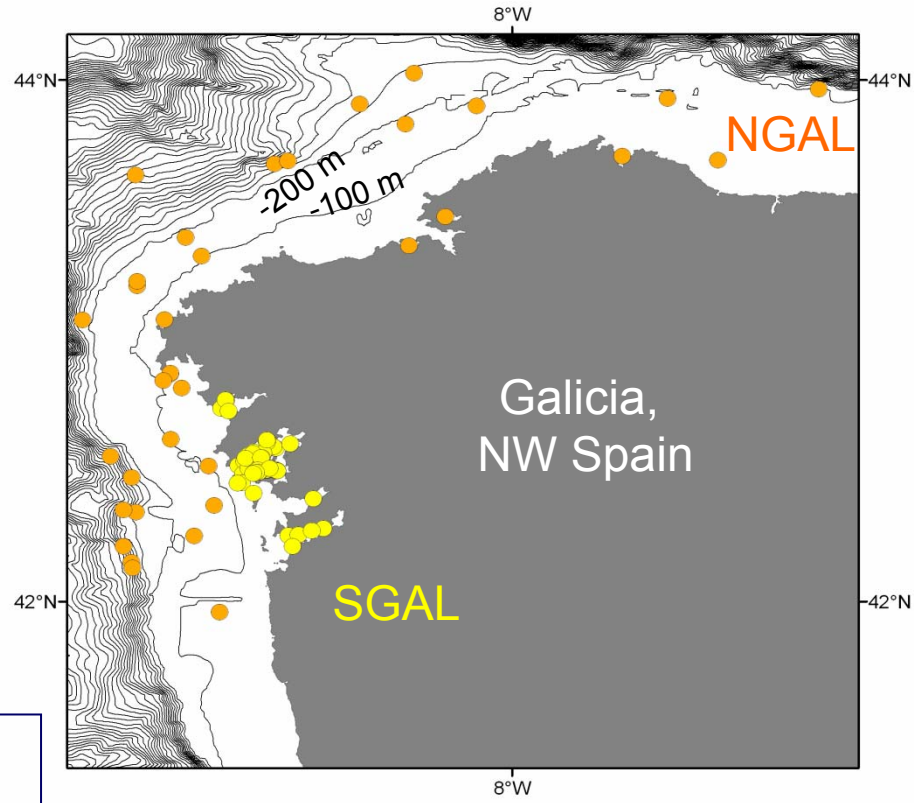


GAM: Presence_Blue whiting ~ Population* + Dolphin_Length*



- Increasing presence of blue whiting with dolphin body size

- SGAL dolphins less presence of blue whiting (p = 0.005)



NGAL
- Pelagic, low $\delta^{13}C$

- More blue whiting, low $\delta^{15}N$

SGAL
- Coastal, high $\delta^{13}C$

- Less blue whiting, high $\delta^{15}N$

Existence of fine scale population structure in bottlenose dolphins in Galicia: 2 genetic populations

Population structure linked to habitat segregation and resource partitioning

Implications for conservation: different threats faced by the two populations

Detailed local studies are needed to better understand the population structure of this species

Stranding location could not always reflect where the animal had lived: ideally paired genetic and stable isotope data at the individual level should be obtained

Thanks!

***Cemma**:*
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