Sonogram Analysis of Calls of Large White-headed Gulls in Western Europe

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Presentation to IGM 7

Jurata, Hel Peninsula, Poland

18th October 2003

Forms Studied

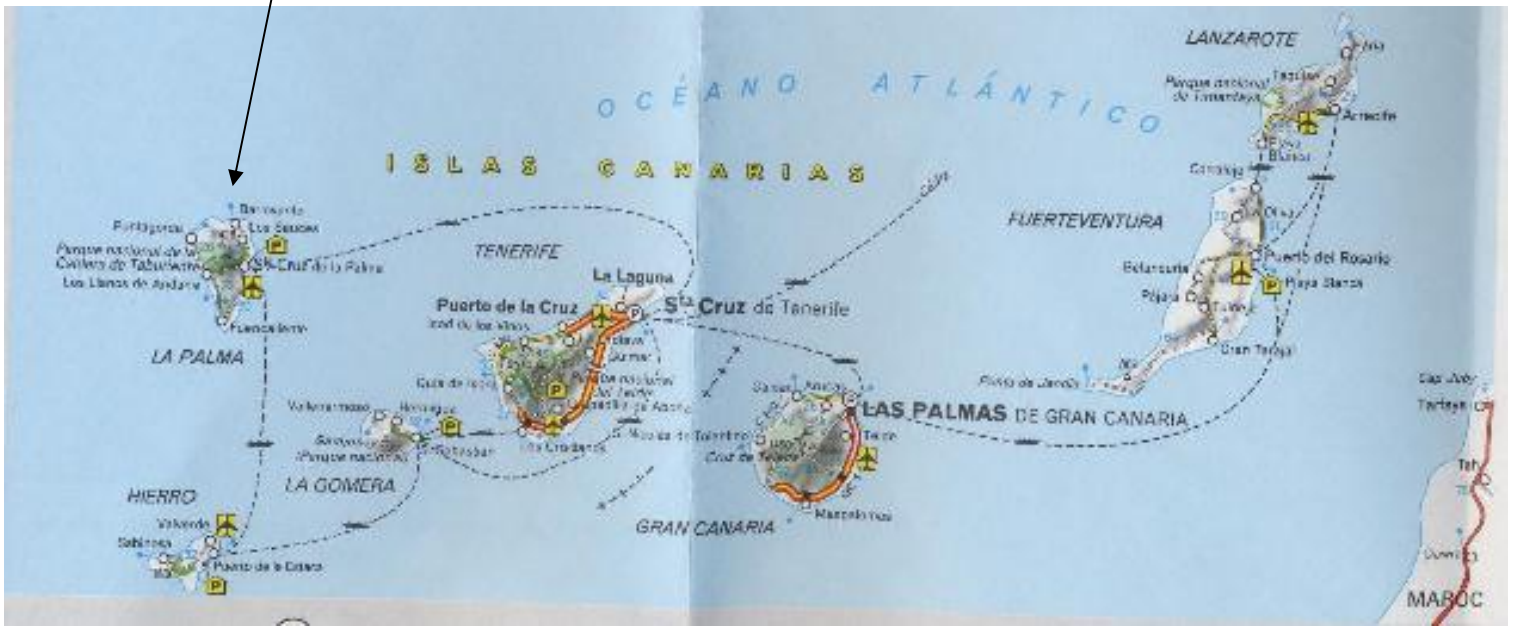
- Herring Gull *argenteus*
- Lesser Black-backed Gull *graellsii*
- Great Black-backed Gull *marinus*
- Atlantic Yellow-legged Gull *atlantis*
- Mediterranean Yellow-legged Gull *michahellis*

Recordings made at

- Ullapool (Scotland) *marinus, argenteus, graellsii*
- Edinburgh (Scotland) *graellsii*
- Devon (England) *argenteus*
- La Palma (Canaries) *atlantis*
- Corsica (France) *michahellis*

La Palma, Canaries

April, 2003



Ullapool, Edinburgh, Devon

Jan-May, 2003

Corsica, France

July 2003

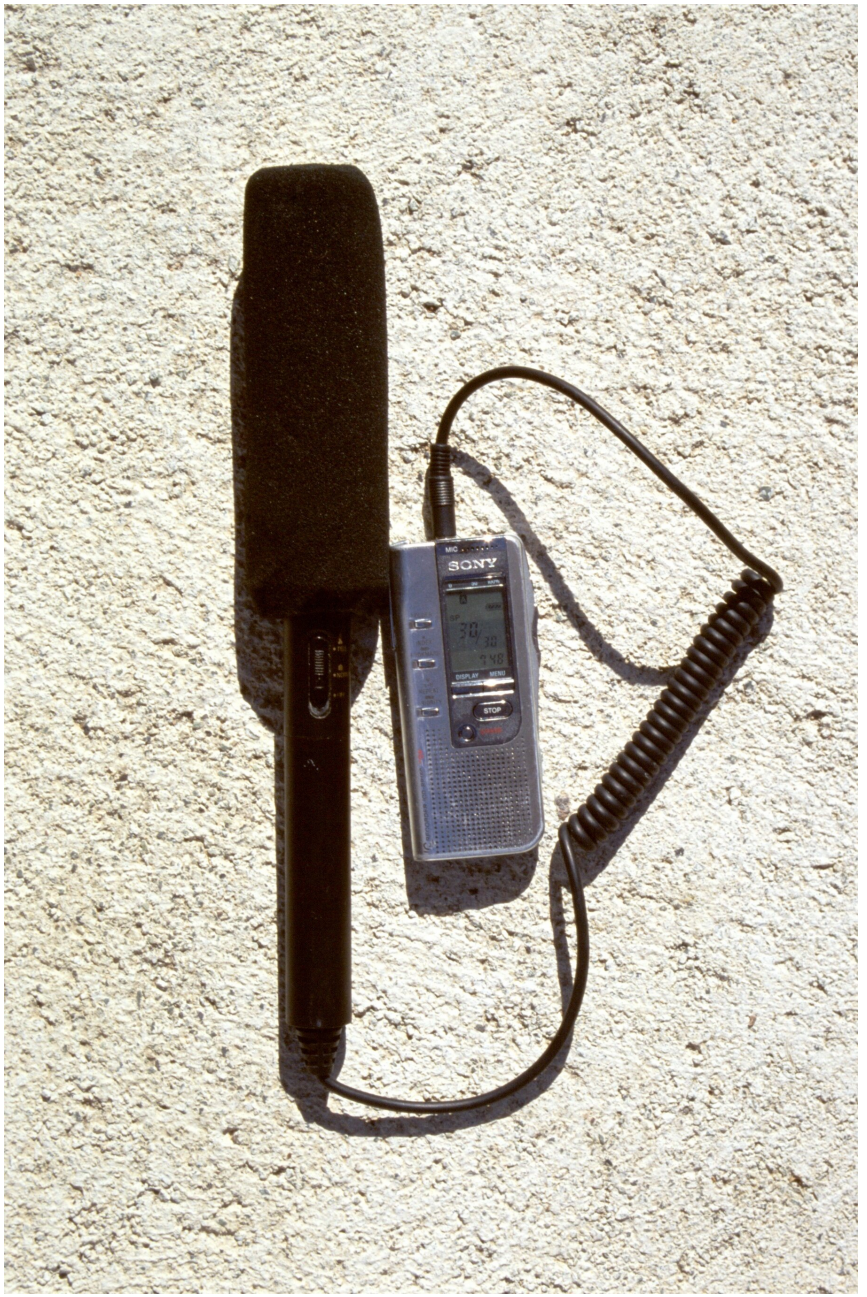
Equipment

Sony IC Digital Voice
Recorder
ICD-BP150

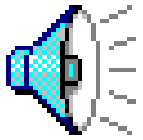
ATR55
Telemike

Transfer files
from Recorder to PC

Analyse on PC using
Spectrogram 8.2
Visualisation Software

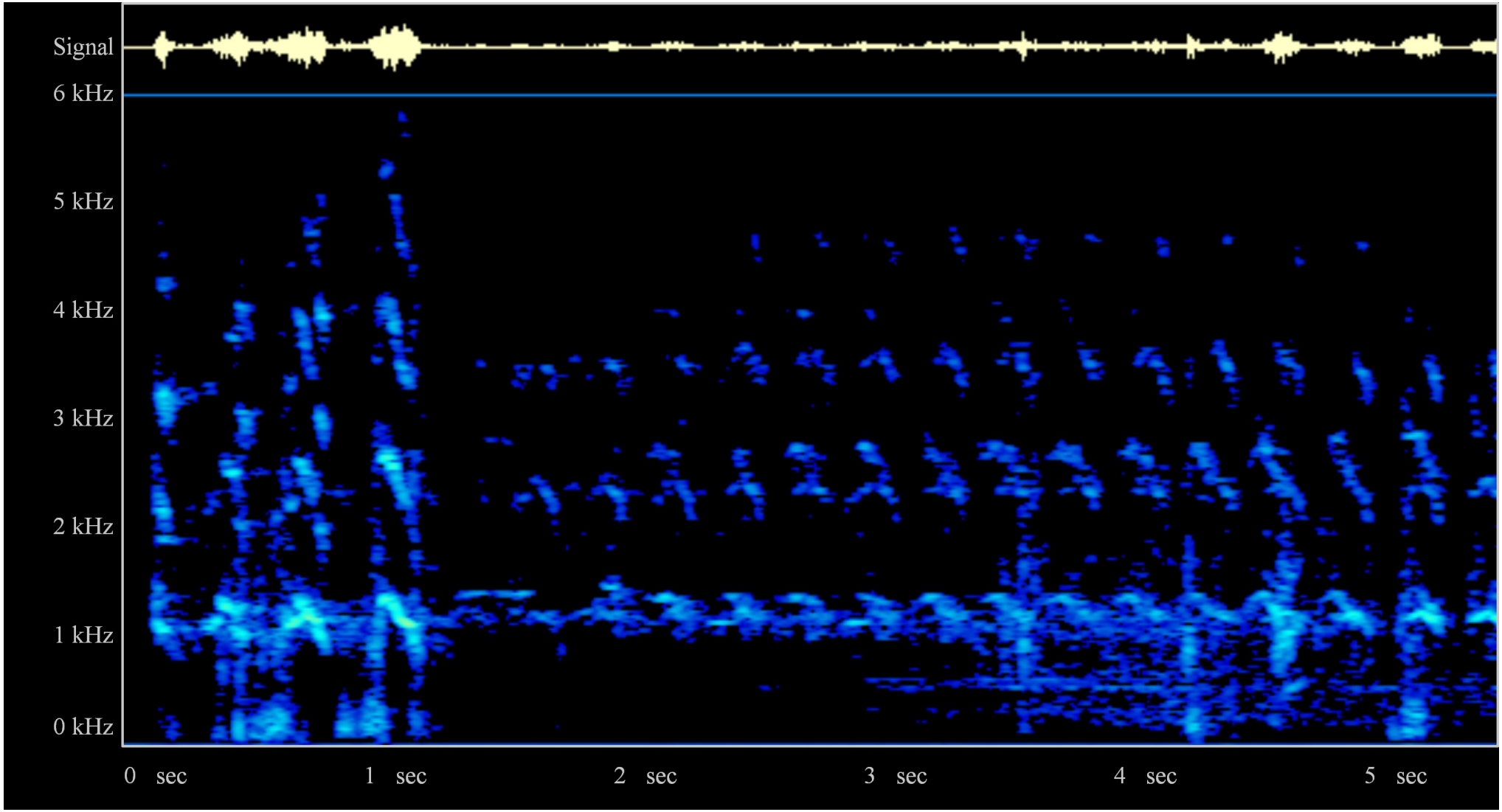


Long Calls *argenteus* - recording



Devon, England, 3 January 2003

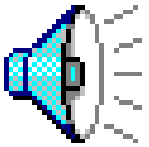
Long Calls *argenteus* - sonogram



Features of *argenteus* long call

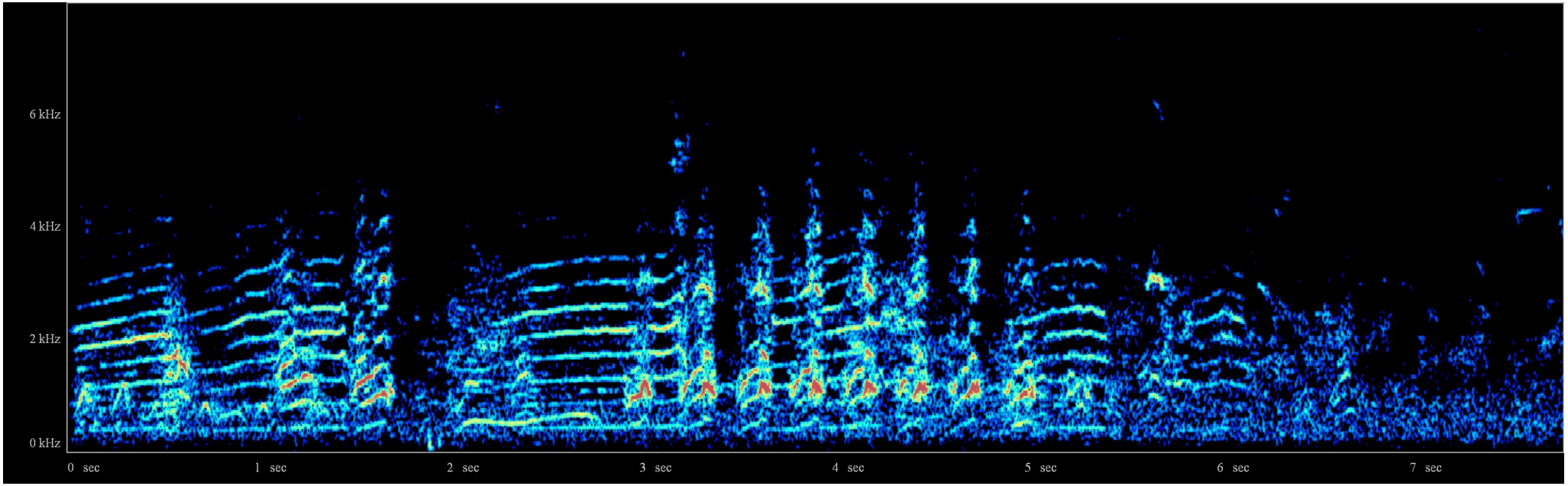
- Circa 14 elements in 3.5 seconds
- 3 main harmonics in each element at circa 1.2, 2.5, 3.5 kHz
- Each harmonic in each note is 'wowed' – clear rise and fall of circa 0.5 kHz
- Very small gap between each element
- Loudest in each harmonic is deepest
- Variation:
  - Some close-up show a higher 4^{th} harmonic at circa 4.7 kHz

Long calls *graellsii* – Edinburgh



6 April, 2003

Long Calls *graellsii* - sonogram

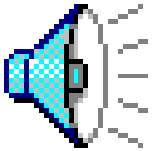


Note: the example above replaces the example given in the talk.

Features of *graellsii* long call

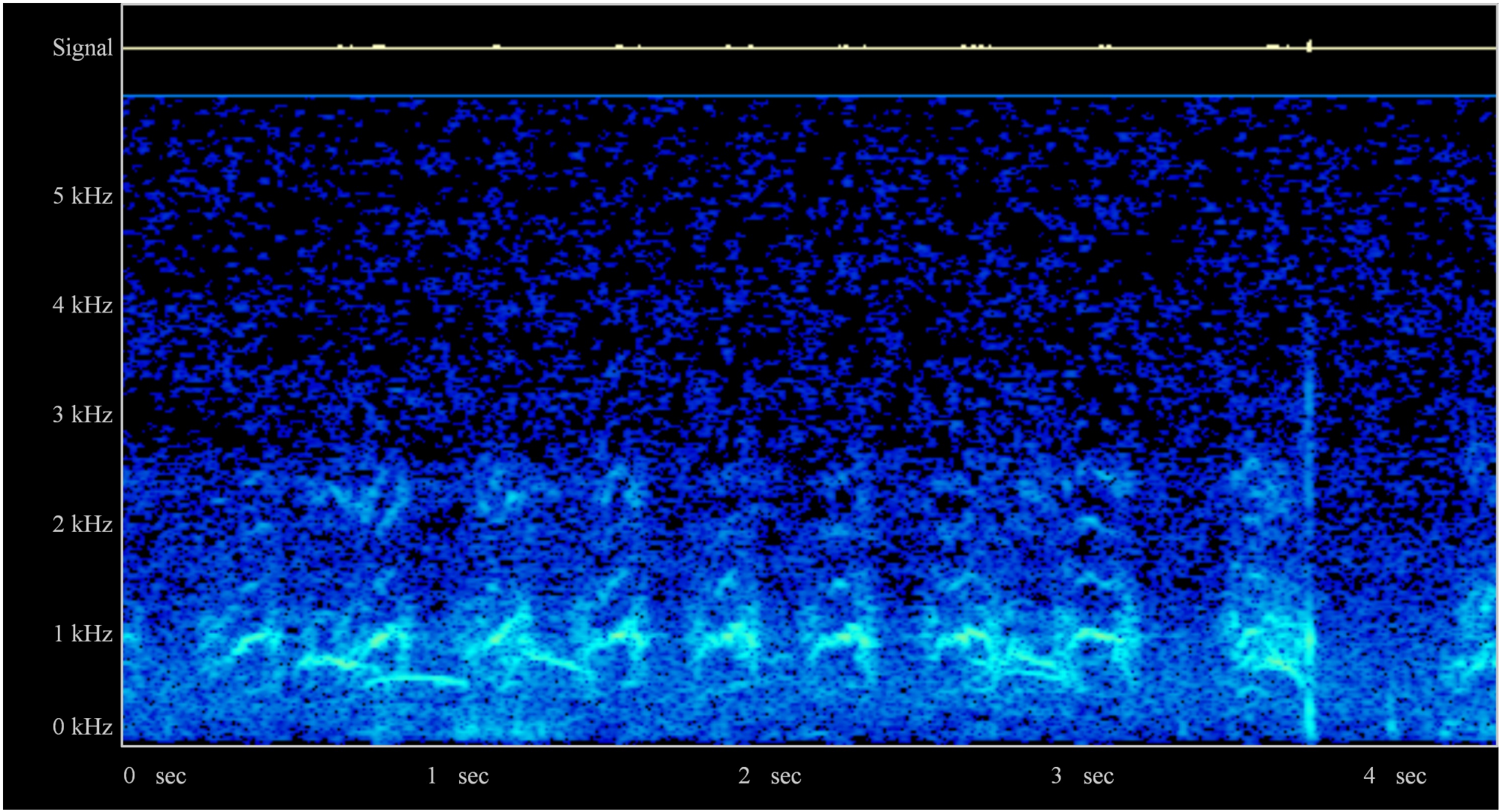
- Circa 8 elements in 2 seconds
- multi-harmonics in each element (8+) from circa 0.5-4 kHz (number depends on volume)
- Each harmonic in each note is almost flat -- rise and fall of only 0.1kHz -- little ‘wowed’
- Significant gap between each element
- Loudest in each harmonic is at 1.0kHz (2nd lowest)
- Variation: Considerable in top note (up to 6kHz) in some cases

Long calls *marinus* – Ullapool



30 May, 2003

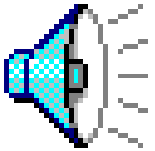
Long Calls *marinus* - sonogram



Features of *marinus* long call

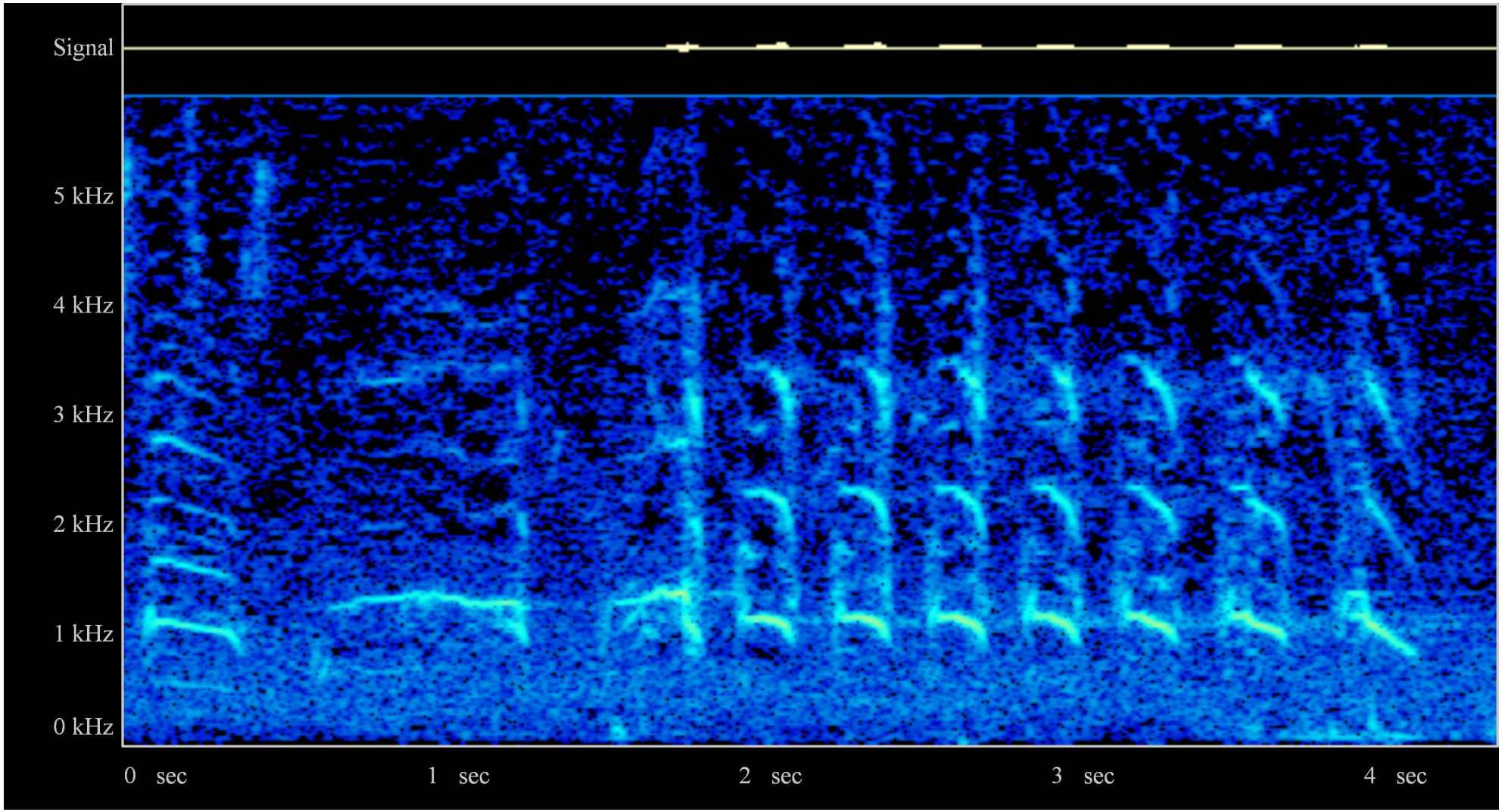
- Circa 9 elements in 3.5 seconds
- One main harmonic in each element at 0.5-1.0 kHz (up to 3 overtones to 2.5 kHz)
- Each harmonic in each note is flat or very slightly 'wowed'
- Significant gap between each element
- Loudest in each harmonic is deepest at 0.5-1.0 kHz
- Variation:
  - Considerable in number of overtones

Long calls *atlantis* – La Palma '*argenteus* type'



Barlovento, 23 April 2003

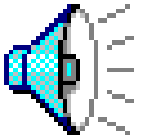
Long Calls *atlantis* - sonogram '*argenteus* type'



Features of *atlantis* long call – '*argenteus* type'

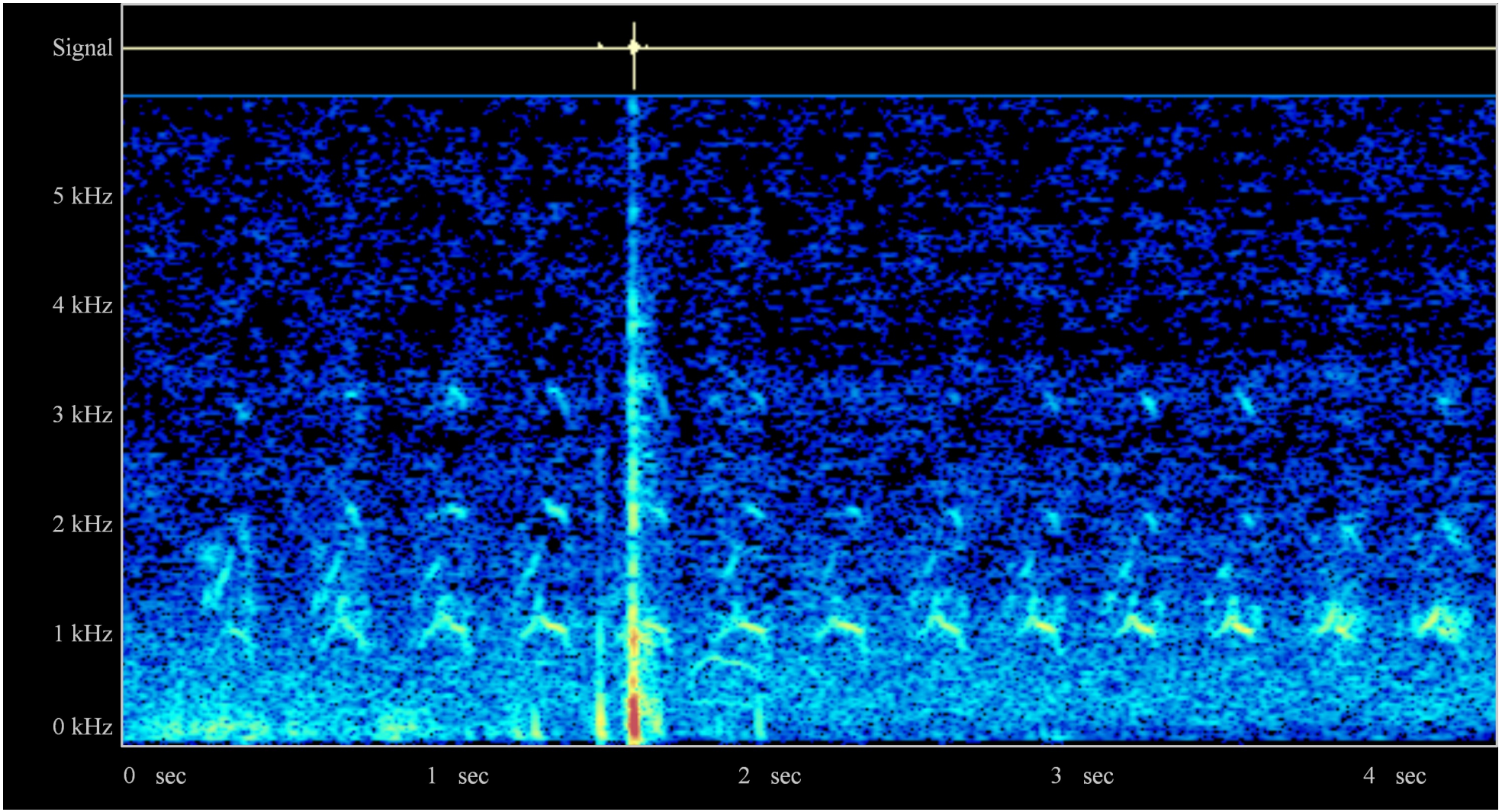
- Circa 8 elements in 2.3 seconds
- Three main harmonics in each element at circa 1.2, 2 and 3 kHz
- Each harmonic in each note is 'wowed' with emphasis on downside
- Slight gap between each element
- Loudest in each harmonic is deepest at 1.2 kHz
- Compared *argenteus*: possibly slightly slower, slightly deeper on top 2 harmonics, slightly larger gap between elements, not quite so much 'wow'

Long calls *atlantis* – La Palma '*graellsii* type'



Barlovento, 23 April 2003

Long Calls *atlantis* – sonogram '*graellsii* type'



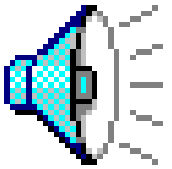
Features of *atlantis* long call – '*graellsii* type'

- Circa 13 elements in 4 seconds
- Three main harmonics in each element at circa 1.1, 2.1 and 3.1 kHz; additional faint harmonics
- Top harmonics are flat, slight 'wow' (0.2 kHz) on lowest harmonic
- Significant gap between each element
- Loudest in each harmonic is at 1.1 kHz
- Compared *graellsii:* slightly slower, fewer harmonics, slightly more 'wow', loudest harmonic is deepest

Previous informal studies (NR)

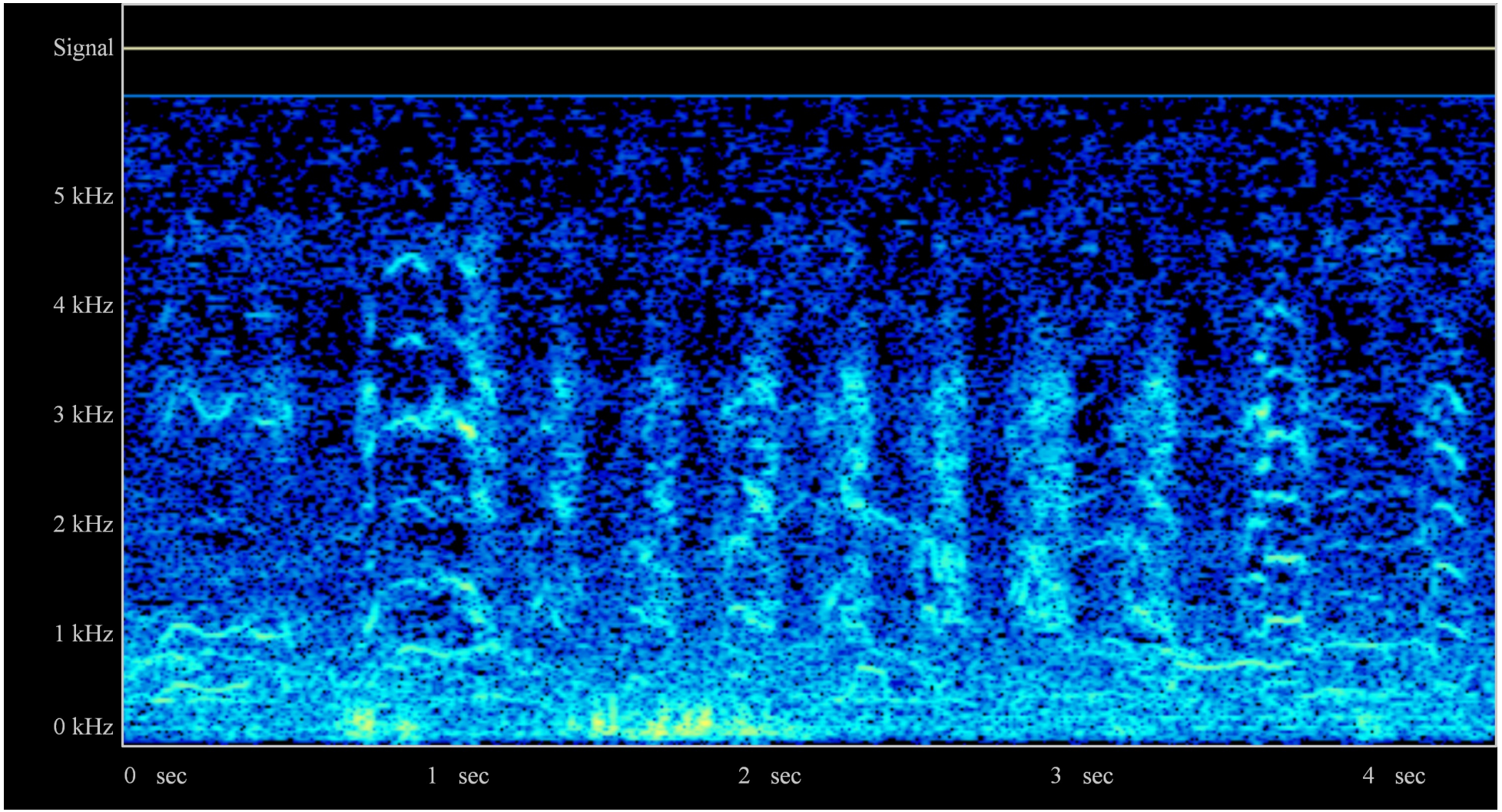
- Found by ear two types of long calls in *atlantis*:
  - Shrill *graellsii* - type
  - Deep *argenteus* - type
- Difference between these calls is:
  - Degree of 'wow' (more marked in *argenteus*-type)
  - Spacing between elements (narrower in *argenteus*-type)
- Difference on sonograms is less than to my ear
- Could merge in single description

Long calls *michahellis* – Corsica



San Ciprianu, 30th July 2003

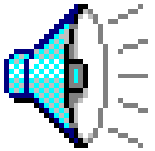
Long Calls *michahellis* – sonogram



Features of *michahellis* long call

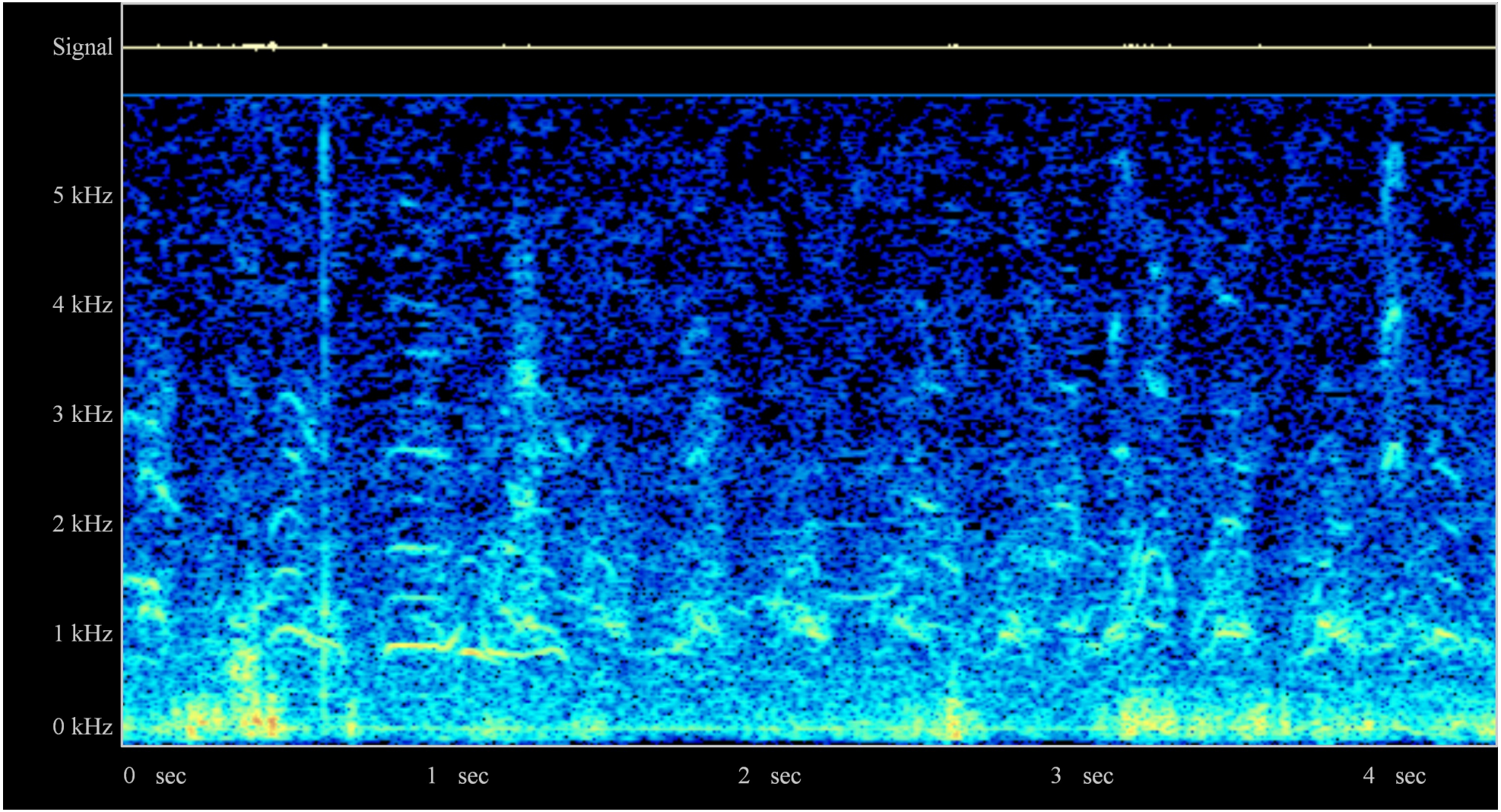
- Circa 8 elements in 2.5 seconds
- multi-harmonics in each element (10+) from circa 1.1-3.3 kHz (number depends on volume)
- Each harmonic in each note is flat - not 'wowed'
- Significant gap between each element
- Loudest in each harmonic is across spectrum
- Variation:
  - Can be deeper, more guttural

Long calls *michahellis* – Corsica Guttural type



San Ciprianu 26th July 2003

Long Calls *michahellis* – sonogram Guttural type

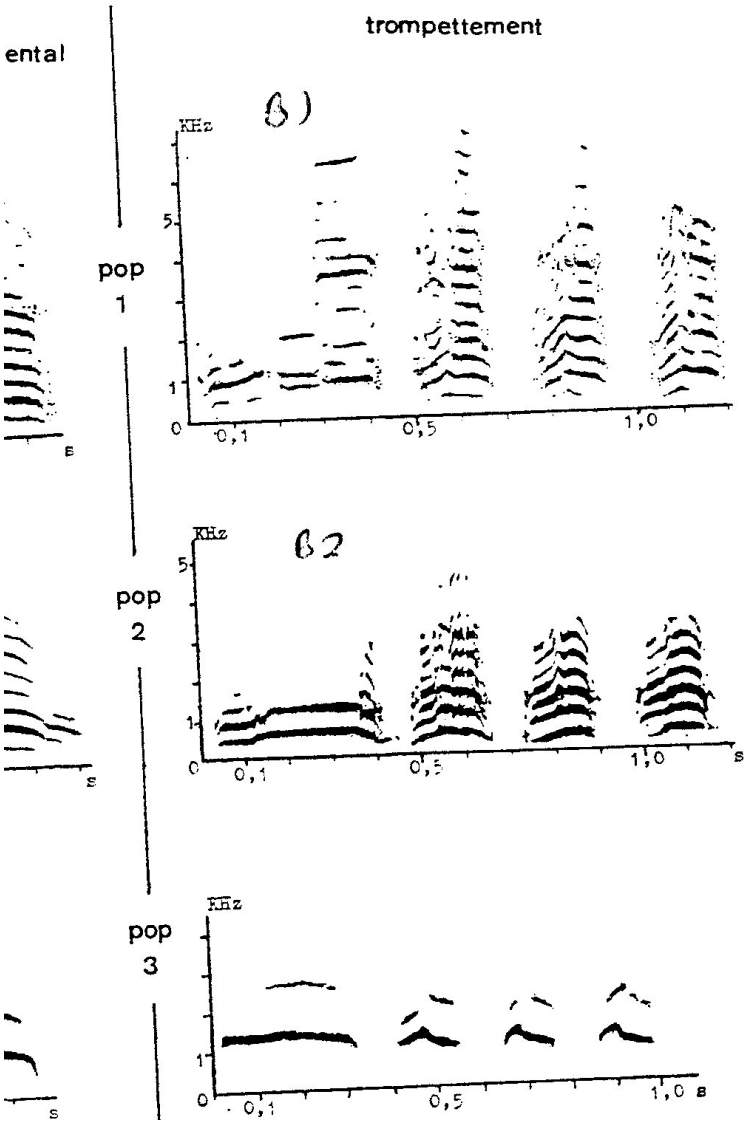


Features of *michahellis* long call Guttural type

- Circa 9 elements in 2.8 seconds
- Multi-harmonics in each element (8+) from circa 0.5 - 2 kHz (number depends on volume)
- Each harmonic in each note is flat - not 'wowed'
- Significant gap between each element
- Loudest in each harmonic is at 1 kHz
- Compared to previous version:
  - Lower range with loudest note deeper as well

Teyssèdre 1983

GOÉLANDS ARGENTÉS A PATTES JAUNES



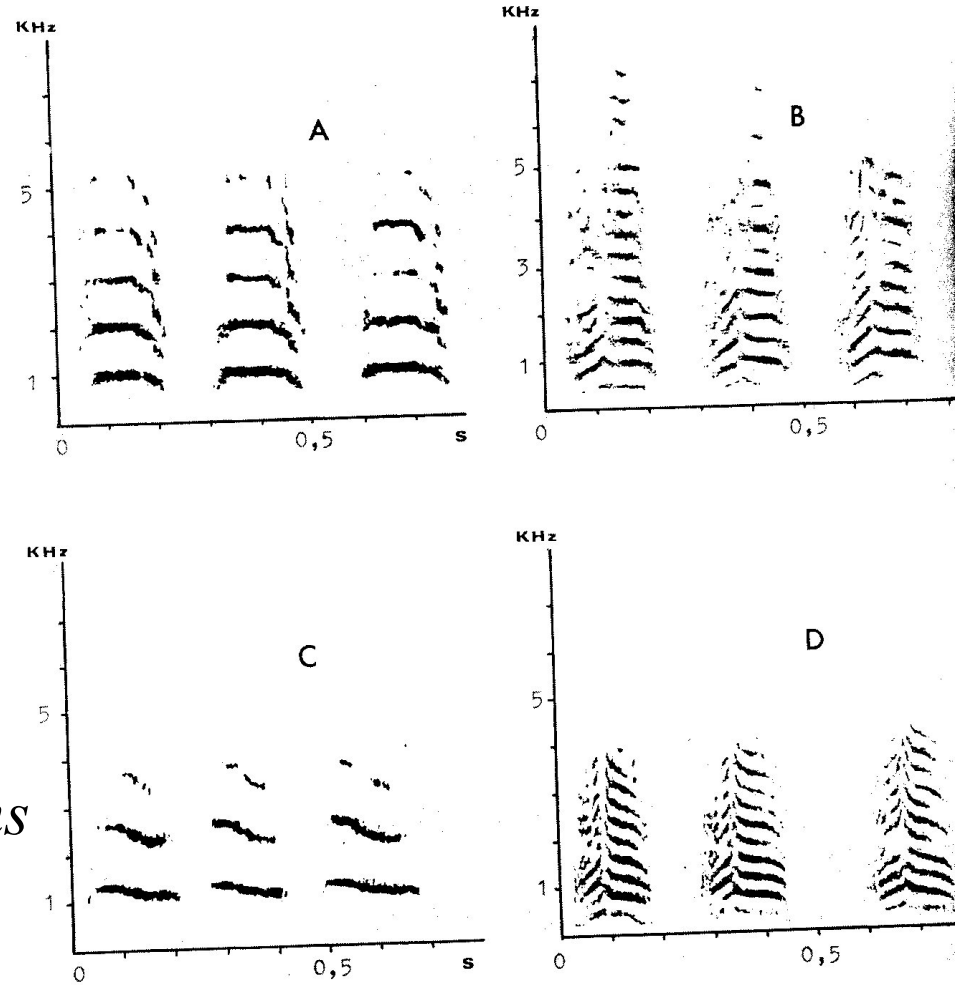
Michahellis
SW France

Michahellis
Camargue

Cantabricans
N Spain

Teyssèdre 1984

Argenteus
SW France



Michahellis

Cantabricans

Graellsii

Fig. 1. a: *Larus argentatus argenteus*, b: *Larus cachinnans* (?) *michahellis*, c: Goéland brique, d: *Larus fuscus graellsii*.

Discussion 1

- More variation in southern forms
- Group on number of harmonics:
  - *marinus* -- 1+
  - *argenteus, atlantis* -- 3+
  - *graellsii, michahellis* -- 8+
- Group on 'wowing'
  - *marinus, graellsii, michahellis*, some *atlantis* – little
  - *argenteus*, some *atlantis* – considerable

Discussion 2

- Group on gap between elements:
  - *marinus, graellsii, michahellis*, some *atlantis* – significant
  - *argenteus*, some *atlantis* – small
- Similarity between *argenteus*, *cantabricans* and some *atlantis*
  - Atlantic species
  - May not be genetic
  - May be convergence to cope with Atlantic
  - Calls across YLG in Atlantic may be similar