

# Telemeta

## Open and collaborative web audio platform for digital sound archive management

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Ecology and Acoustics 1st Symposium - 16/06/2014



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- Current development
- Lessons learned

# The Telemeta Project



<http://telemeta.org/>

## Main goals

- Archive, preserve and manage large audio database and related metadata
- Play audio data and read metadata synchronously
- Process audio data on demand through a modular architecture (no pre-processing needed)
- Index and share audio data through a collaborative web app
- Link audio data to various ontologies, external services and related multimedia files
- Manage users, share and access rules, copyrights easily through time

## History of the project

- 2006: Define objectives = *open source web audio collaborative platform*
- 2007: First partner: french Center for Research in Ethnomusicology (CREM)
- 2011: Release of **Telemeta 1.0** and deployment of the "*Sound archives of the CNRS - Musée de l'Homme*" <http://archives.crem-cnrs.fr>
- 2013 - 2014: Provide audio processing capabilities through the DIADEMS project

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# CREM's platform

 Recherche

Bienvenue, Guillaume Pellerin | Profil | Aide | Déconnexion

Bureau Archives Géo-Navigateur Recherche avancée Utilisateurs Admin

## Archives sonores du CNRS - Musée de l'Homme

Le fonds d'archives sonores du CNRS - Musée de l'Homme rassemble des enregistrements inédits et publiés de musique et de traditions orales du monde entier, de 1900 à nos jours. Constitué de supports variés (cylindres, 78 tours, disques vinyles, cassettes, supports numériques), ce fonds se positionne parmi les plus importants d'Europe en terme de qualité, de quantité et de diversité.

Pour une présentation historique du fonds, voir [le site du CREM](#).



## Contenu

Géré par le [Centre de Recherche en Ethnomusicologie \(CREM\)](#) cette base de données répertorie :

- ✓ Plus de 30 000 documents inédits, dont les 2/3 sont sonorisés, répartie dans plus de 1 000 collections, représentant près de 4 000 heures d'enregistrements de terrain non publiés.
- ✓ Plus de 13 000 enregistrements édités, dont 3 000 sonorisés, dans plus de 4 600 collections, pour environ 3 700 heures (incluant plus de 5 000 disques dont beaucoup sont très rares).
- ✓ 199 pays sont représentés à travers plus de 1 200 groupes ethniques ou sociaux, donnant à entendre une large palette d'expressions musicales et chantées, de langues et de dialectes.

Certains enregistrements sont consultables avec un code d'accès. Pour l'obtenir écrivez à [crem.lesc\(at\)mae.u-paris10.fr](mailto:crem.lesc(at)mae.u-paris10.fr) en expliquant les motifs de votre demande. Le fonds d'archives est également consultable sur les postes dédiés disponibles au [CREM](#), à la [Bibliothèque Eric de Dampierre](#), à la [Médiathèque du Musée du Quai Branly](#) et à la [Bibliothèque du Muséum National d'Histoire Naturelle](#).

## Organisation du catalogue

Le catalogue est organisé en 4 niveaux : Fonds, Corpus, Collection et Items. Le niveau principal de description est la Collection. Chacune regroupe un ensemble cohérent de fichiers audio (items) correspondant le plus souvent à des enregistrements collectés au cours d'une même mission de recherche ou à un disque publié. Certaines collections sont elles-mêmes regroupées en corpus et en fonds associés à des collecteurs.

Le nombre d'enregistrements mis en ligne sur la plateforme est en constante augmentation. Les fiches descriptives sont renseignées de manière collaborative par les usagers de la plateforme : chercheurs, étudiants, documentalistes.

Le CREM accueille toutes les collaborations visant à enrichir et valoriser ce précieux patrimoine. Ecrivez-nous à [crem.lesc\(at\)mae.u-paris10.fr](mailto:crem.lesc(at)mae.u-paris10.fr).

### Sélection musicale

Danse des Nekrakaroré - Indiens kayapo-Kubenkränkeñ (Face B\_02)  
Brésil, Amérique du Sud, Amérique

00:00 00:30 01:00

Waveform spectral

CREM-CNRS - Item : CNRSH\_E\_1973\_001\_001\_001\_08 Telemeta powered

### Géo-Navigateur

Google Maps API v3 ©2012 Google. Tous droits réservés.

### Dernières modifications

13 juin Rituel Gélédé et masques item a.julien

## CREM's Geo-navigator

 Navigateur géographique

Carte | Liste



# Extend the usecases

## Usages

- **Do research work, share** audio data and collaborate online and with other researchers or expert communities.
- **Teach** with audio materials for lessons, academic works and exams.
- **Publish** documented audio ressources from interactive kiosks (full access given to IP ranges)

## Domains

- Musicology
- Anthropology
- Museology
- Computer science
- Biology
- Ecology

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# Bioacoustic usecase

## Usages

- Synchronize large bioacoustic audio datasets in to a robust and scalable platform
- Share audio data and metadata with experts to make them collaborate in editing, processing and discovering
- Build large statistical campaigns and visualizations from taxonomies, geographic data and sounds
- Scale the audio data through the web (URL indexes)

## Applications

- Realtime bioacoustical monitoring system over internet (needs hardware)
- Biodiversity studies
- Development and test of new species detection algorithms on large and historical datasets

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# Technologies & Key features

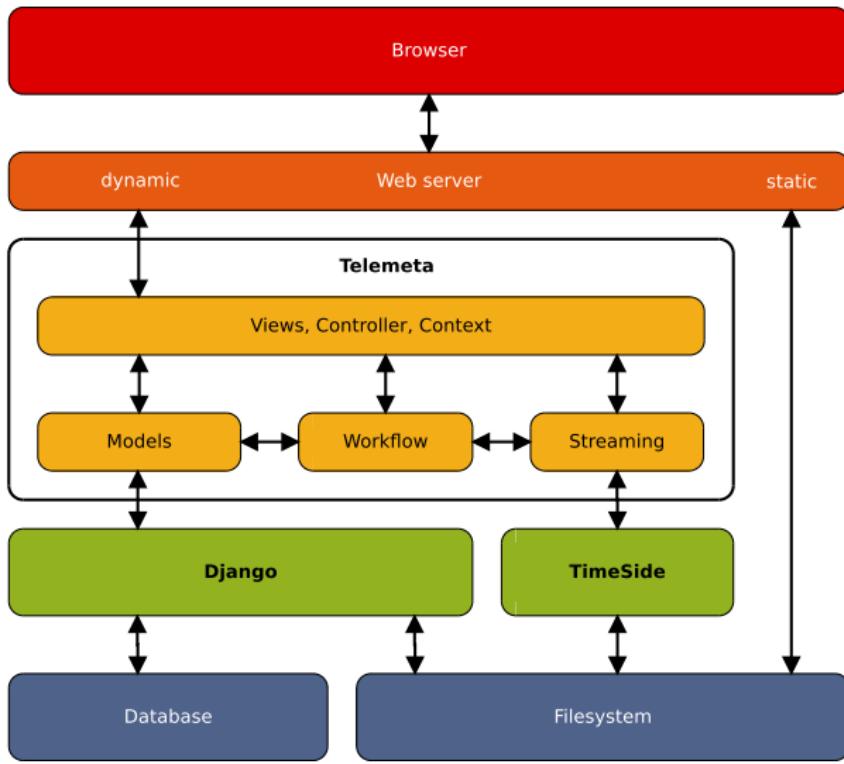
## Technologies → 100% Open Source!

- GNU / Linux : applications, libraries and kernel
- Django (web platform), Python (cool and smart object oriented language with web and scientific libraries), GStreamer (multimedia framework)
- MySQL, PostgreSQL, others : relational databases
- TimeSide : open web audio processing framework

## Key features

- Pure HTML5 web user interface including dynamical forms and smart workflows
- On the fly audio analyzing, transcoding and metadata embedding in various formats
- Social editing with semantic ontologies, smart workflows, realtime tools, human or automatic annotations and segmentations
- User management with individual desk, playlists, profiles and access rights
- High level search engine (geolocation, instruments, ethnic groups, etc...)
- Data providers : DublinCore, OAI-PMH, RSS, XML, JSON and other
- Multi-language support (now english and french)

# Architecture



1

## Overview

- The Telemeta Project
- Sound archives of the CREM / CNRS
- Usecases
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2

## Related projects

- TimeSide
- SABIOD

3

## Conclusion

- Current development
- Lessons learned

# TimeSide : open web audio processing framework

## Server side - TimeSide Engine

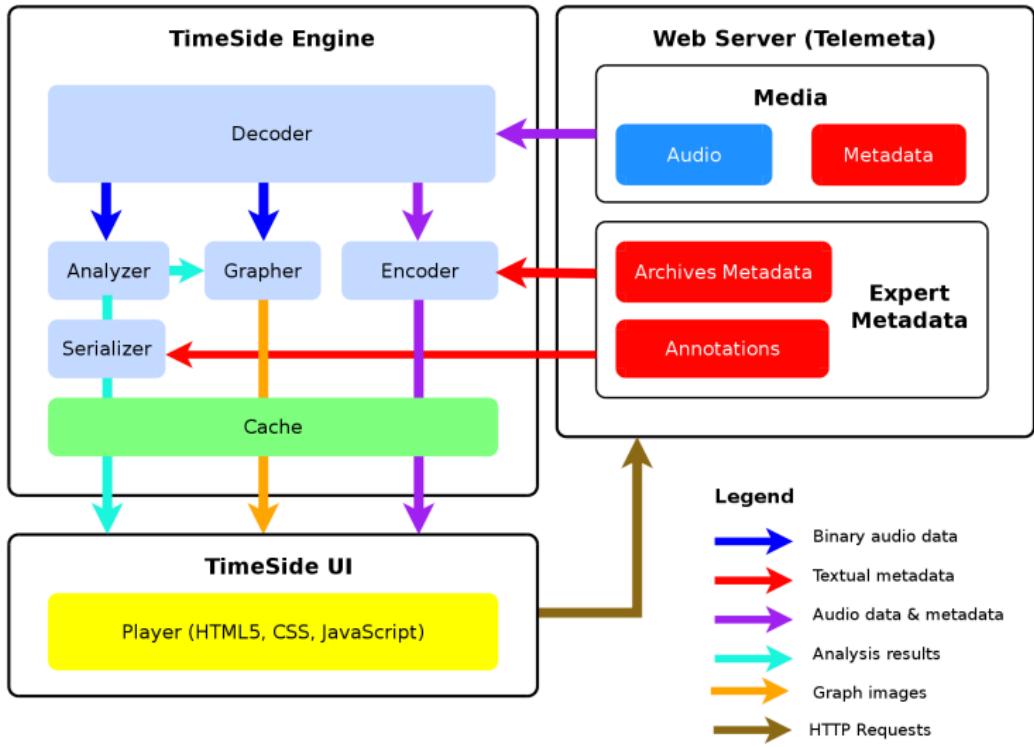
- **Do** asynchronous and fast audio processing with Python,
- **Decode** audio frames from ANY format into numpy arrays,
- **Analyze** audio content with state-of-the-art audio feature extraction libraries (Aubio, Yaafe, Vamp (experimental)),
- **Organize**, serialize and save analysis metadata through various formats,
- **Draw** various fancy waveforms, spectrograms and other cool graphers,
- **Transcode** audio data in various media formats and stream them through web apps,

## Client side - TimeSide UI

- **Playback** and **interact** on demand through a smart high-level HTML5 extensible player,
- **Index**, **tag** and **organize semantic metadata**  
(see [Telemeta](#) which embeds TimeSide).



# TimeSide - Architecture



# SABIOD: Scaled Acoustic Biodiversity (prototype) - Home Page

 Search

Welcome, Guillaume Pellerin | Help | Sign out

Desk Archives Geo Navigator Advanced search Admin

## SABIOD - Scaled Acoustic BIO Diversity platform

Bioacoustic signaling is a primary mode of communication and exploration for most of the animals. It enables quick load and transfer of information without any visible contact with the target, tailoring the reduced visibility of deep forest (insect, frogs, birds, mammals...), cave or night activities (insects, bats), and/or the long distances like in ocean (krill, fishes, whales...). Bioacoustics is also one of the factors in optimizing natural selection, playing a significant role in signalling resource qualities to potential partners.

The SABIOD project aims to detect, cluster, classify and index bioacoustic big data in various ecosystems, at different space and time scales, in order to reveal informations on the complex sensori-motor loop, and on the health of an ecosystem, yielding to new biodiversity insights.

**Keywords :** Acoustics, Signal Analysis, Machine Learning



## NEWS

- International Workshop on Neural Information Scaled to Bioacoustics (joint to NIPS 2013) 10th dec - deadline ext. abstract 13th oct.
- IEEE ATSP'14 last CFP - Special session on Bioacoustics Int. conf. on Ad. Tech. for Signal & Image Processing

## The Telemeta Platform

The collaborative platform **Telemeta** aims to make sound archives available to researchers and to the extent possible, the public, in compliance with the intellectual and moral rights of collectors. Developed with the support of the program **TGE-Adonis** of the **CNRS**, allows researchers to exchange data online with communities, including through collaborative tools

like markers , spaces, comments, etc...

## CREDITS

SABIOD is a **CNRS** Big Data Interdisciplinary project 2012-2014

Laboratories : **LSIS**, **LIP6**, **CNPS**, **MNHN**, **LIG**, **Géoazur**



## Sound selection

SABIOD\_NIPS4B\_Indian\_River\_Lagoon\_file0006



## Last changes

Date	Title	Type	User
Jan. 22, 2014, 11:23 p.m.	Chaffinch call	marker	t.fillon
Jan. 22, 2014, 11:23 p.m.	Chaffinch call	marker	t.fillon
Jan. 22, 2014, 11:23 p.m.	Chaffinch call	marker	t.fillon
Jan. 22, 2014, 11:23 p.m.	Chaffinch call	marker	t.fillon
Jan. 22, 2014, 11:22 p.m.	Chaffinch call	marker	t.fillon
Jan. 22, 2014, 11:22 p.m.	Chaffinch call	marker	t.fillon
Jan. 22, 2014, 11:22 p.m.	Chaffinch call	marker	t.fillon

## Telemeta Partners

Ecology & Acoustics - 16/06/2014

13 / 19

# SABIOD: Scaled Acoustic Biodiversity (prototype) - User Interface

 Search

Welcome, Guillaume Pellerin | Help | Sign out

Desk Archives Geo Navigator Advanced search Admin

Item : data-20120421\_085357\_pinson\_arbre\_cri\_contact

Edit Copy Add to playlist  
 Previous Next



Title data-20120421\_085357\_pinson\_arbre\_cri\_contact  
Collector  
Collection SABIOD\_Port-Cros  
Recording date April 20, 2012 - April 23, 2012

## Geographic and cultural informations

Location  
Population / social group  
Ethnographic context

## Musical informations

Number Composition Vernacular name Interprets

Analysis		Markers	
1	00:00:00.29 cri	EDIT	
author:	admin		
2	00:00:01.21 Chaffinch call	EDIT	
Pinson des arbres			
author:	admin		
3	00:00:02.76 Chaffinch call	EDIT	
Pinson des arbres			

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# Current development - The SABIOD project

## Bioacoustics - SABIOD

- Add support for phylogeny and various bio taxonomies to Telemeta
- Add bioacoustic detection models to TimeSide (bats, dolphins, whales, etc...)
- Extend audio sampling frequencies
- Automatic synchronization from hardware audio source

# Current development

## Telemeta

- Update web framework (DJANGO) and geolocation services
- Enhance user interface (full HTML 5 + web audio API)
  - For annotations and segmentations in a collaborative manner
  - Provide import capabilities and feedback loop between manual and automatic annotations
  - Fancy displays of automatic analysis results (zoomable + synchronized with audio)
  - Add a User interface to control and tune the analysis parameters
  - Add public and enhanced user playlists
- More documentation

## TimeSide

- Tiny web server based on Django (done)
- Process task manager (done)
- Add more audio & acoustic analysis tools for automatic analysis
- Add more automatic segmentation and classification tools to support various semantic ontologies (cf. thesaurus)

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# Lessons learned

## Lessons learned from a 7 years old project

- Simplicity is better than complexity (**KISS**)
- **Modularity** is only accessible with a flexible language (thanks Python!)
- **Models** and **Objects** are more important than Technologies
- A good **workflow** is defined by the users themselves through **feedback** and constant revisions
- **Prototyping** is a crucial part of the development process
- A good platform relies on **standards**, not on formats
- The **Open Source** ecosystem gives some **tremendous** possibilities to develop, deploy and scale any platform project

# The End

Thank you!

We are looking for new collaborations  
in ecology and bioacoustic fields. Let's keep in touch!

## Links

- [telemeta.org](http://telemeta.org) , [sabiod.telemeta.org](http://sabiod.telemeta.org)
- [@telemeta](https://twitter.com/@telemeta)

## Contact me

- [guillaume@parisson.com](mailto:guillaume@parisson.com)
- [@yomguy](https://twitter.com/@yomguy)
- [github.com/yomguy/](https://github.com/yomguy/)
- [+GuillaumePellerin](https://www.linkedin.com/in/guillaumepellerin)
- [fr.linkedin.com/in/guillaumepellerin](https://fr.linkedin.com/in/guillaumepellerin)

# TimeSide - Github repository

<https://github.com/yomguy/TimeSide/>

- 3 main branches: master, dev, diadems

## Installation

<https://github.com/yomguy/TimeSide#install>

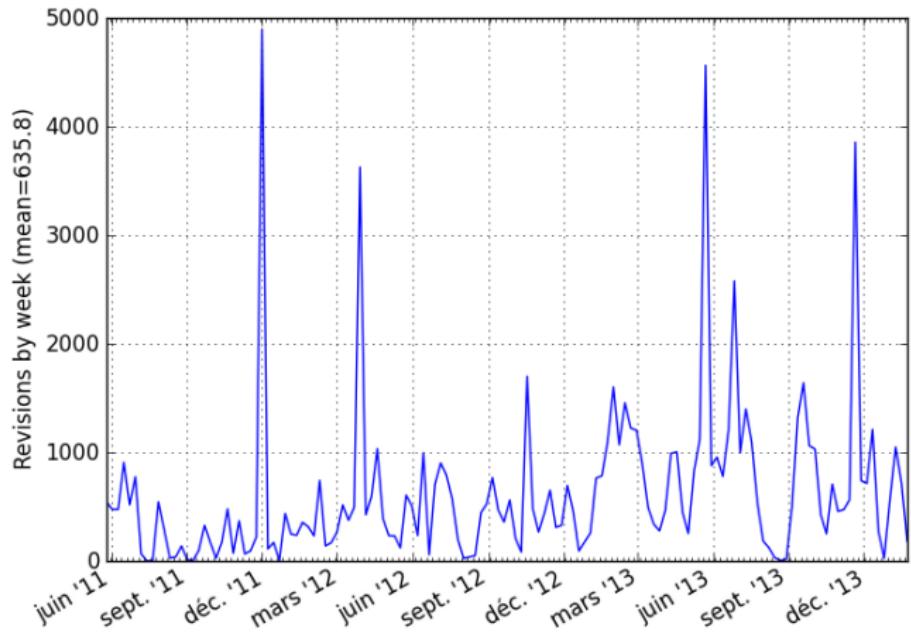
- Installation des dépendances :

```
$ echo "deb http://debian.parisson.com/debian/ stable main" |  
$ sudo tee -a /etc/apt/sources.list  
$ echo "deb-src http://debian.parisson.com/debian/ stable main" | sudo tee -a /etc/apt/sources.list  
$ sudo apt-get update  
$ sudo apt-get install git  
$ sudo apt-get build-dep python-timeside
```

- Installation depuis le dépôt *Github* :

```
$ git clone https://github.com/yomguy/TimeSide.git  
$ cd TimeSide  
$ git checkout dev  
$ export PYTHONPATH=$PYTHONPATH:'pwd'  
$ python tests/run_all_tests
```

# Statistics - CREM revisions



# CREM's Telemeta platform

- 2007: first partner: french Research Center of Ethnomusicology (CREM)
- 2007 - 2009: technical specifications, definition of the DB migrator
- 2008: prototype development
- 2008 - 2010: workflow and format specifications
- 2011: development, final migration and release of **Telemeta 1.0** to the CREM for production : <http://archives.crem-cnrs.fr>
- 2011 - 2014: collaborative indexing, more development, massive data imports...

# Workflow

Example: CREM audio archive access rules vs. resource status

Collection status	Item status	Priority	Sliding date	Admin & Doc access	Member access	Public access
full	full	Collection	x	full	full	full
metadata	metadata		x	full	full	metadata
metadata	metadata			full	metadata	metadata
none	none		x	full	none	none
none	none			full	none	none
mixed	full	Item	x	full	full	full
	metadata		x	full	full	metadata
	metadata			full	metadata	metadata
	none		x	full	none	none
	none			full	none	none

# Web User Interface

 Search

Welcome, Guillaume Pellerin | Profile | Help | Sign out

Desk Archives Geo Navigator Advanced search Users Admin

Item : LAMENTATIONS ET CHANTS D'AMOUR\* :03-08

Edit Copy Add to playlist  
 Previous Next



Title	LAMENTATIONS ET CHANTS D'AMOUR*
Collector	
Collection	CNRSMH_I_1976_011
Recording date	Jan. 1, 1900 - Dec. 31, 1900
Last modification	July 7, 2011, 12:51 p.m. (j.simonnot)

## Geographic and cultural informations

Location	Algérie, Afrique septentrionale, Afrique
Location details	Stèpe, Hauts Plateaux
Cultural area	OULED NAYAL
Language	arabe
Population / social group	Arabe
Ethnographic context	

## Musical informations

Analysis	Markers
1 00:00:06.29	Lamentation
author: j.simonnot	
2 00:00:44.63	chant d'imposition du
adressé au marié.	
Traduction:L'imposition de ton henné est ma plus	
author: j.simonnot	
3 00:01:15.04	Ayay
Chant non mesuré	
author: j.simonnot	

# Data model



## Other objects

- Instrument, InstrumentAlias, InstrumentRelation, InstrumentAliasRelation, Performance
- Location, LocationAlias, LocationRelation, LocationAliasRelation
- EthnicGroup, Format, PhysicalFormat, Publisher and various other Enumarations (1D lists)
- Language (ISO 639-3)
- Revision, PlayList, Profile, etc...

## All objects

[view online PDF](#)

# The DIADEMS project

- **DIADEMS** : Description, Indexation, Access to Sound and Ethnomusicological Documents
- Granted by ANR : french national research agency (ANR-12-CORD-0022)
- 3 years, 8 partners, 850 k€
- Apply and test MIR algorithms on large scale ethnomusicological data
- Define some high level interfaces to find new ways of explorations in large complex musical corpus
- New modes of collaboration between human science and computer science laboratories and researchers
- Define the **vocabulary** describing musical events in the usecase of ethnomusicology vs. signal processing
- <http://www.irit.fr/recherches/SAMOVA/DIADEMS/fr/welcome/>
- <http://diadems.telemeta.org>

# DIADEMS - Partners

- Sponsors:

- CNRS
- Huma-Num (ex TGE Adonis)
- ANR
- CREM
- UPMC
- Parisson

- Partners :

- IRIT (université Paul Sabatier, Toulouse 3)
- LIMSI (universités Pierre et Marie Curie (UPMC, Paris 6) et Paris-Sud)
- LAM (institut Jean Le Rond d'Alembert, UPMC)
- LABRI (université de Bordeaux)
- CREM (université Paris Ouest Nanterre La Défense)
- LESC (université Paris Ouest Nanterre La Défense)
- Museum d'Histoire Naturelle de Paris
- Musée du Quai Branly



# SABIOD: Scaled Acoustic Biodiversity (prototype)

This repository Search or type a command Explore Gist Blog Help

yomguy Unwatch Star Fork

PUBLIC yomguy / django-phylogeny forked from pombredanne/django-phylogeny

Django Phylogeny is an app for working with phylogenetic trees in the Django web development framework.  
<http://github.com/randalmorey/django-phylogeny> — Edit

186 commits 3 branches 10 releases 2 contributors

branch: master django-phylogeny / +

This branch is 0 commits ahead and 0 commits behind master

add initial migration

yomguy authored on 4 Dec 2013 latest commit d30eb2e55a

phylogeny add initial migration 6 months ago

AUTHORS added package files 3 years ago

CHANGELOG.md added change notes to changelog 3 years ago

INSTALL clarified description of optional django-colors app in the install pa... 3 years ago

LICENSE added package files 3 years ago

MANIFEST.in added package files 3 years ago

README.md added mention of optional django-colors app to readme.md 3 years ago

setup.py added package files 3 years ago

README.md

Django Phylogeny

Code Pull Requests Wiki Pulse Graphs Network Settings

SSH clone URL git@github.com:yomguy/django-phylogeny You can clone with HTTPS, SSH, or Subversion.

Download ZIP

# SABIOD: Scaled Acoustic Biodiversity (prototype)

## Django administration

Home > Phylogeny > Taxa > Add taxon

Welcome, Guillaume. Change password / Log out

### Add taxon

[Save and add another](#)

[Save and continue editing](#)

[Save](#)

Scientific name:

Slug:

short label containing only letters, numbers, underscores, and/or hyphens; generally used in URLs

Rank:

Is leaf node:



#### general information

Common name:

Tagline:

very short description

Category:



General description:

Ecology:

Distribution:



# SABIOD: Scaled Acoustic Biodiversity (prototype)

**Citations**

Citation: #1

Description:

URL:

DOI®: digital object identifier:

[+ Add another Citation](#)

**Taxon Images**

Taxon Image: #1

Caption:

Credit:

Category:  [+ Add](#)

Primary image  
primary image for specified taxon

Source:  Aucun fichier choisi

[+ Add another Taxon Image](#)

**Distribution points**

Place name	Latitude	Longitude	Delete?
<input type="text"/>	<input type="text"/>	<input type="text"/>	<a href="#">Delete?</a>

[+ Add another Distribution Point](#)

**Taxonomy records**

Taxonomy database	Taxon record ID	URL	Delete?
<input type="text"/> <a href="#">+ Add</a>	<input type="text"/>	<input type="text"/>	<a href="#">Delete?</a>

[+ Add another Taxonomy Record](#)

[Save and add another](#) [Save and continue editing](#) [Save](#)

# Development board

## Links

- <http://telemeta.org>
- <https://github.com/yomguy/Telemeta/>
- <https://github.com/yomguy/TimeSide/>
- <https://github.com/Parisson/Telemeta-doc/>

## Team

- Guillaume Pellerin
- Thomas Fillon
- Paul Brossier
- Riccardo Zaccarelli
- Maxime Lecoz
- David Doukan