

# Stratégie de gestion et d'accessibilité des données

Sylvie Fiat, Régis Hocdé, 16 mars 2023

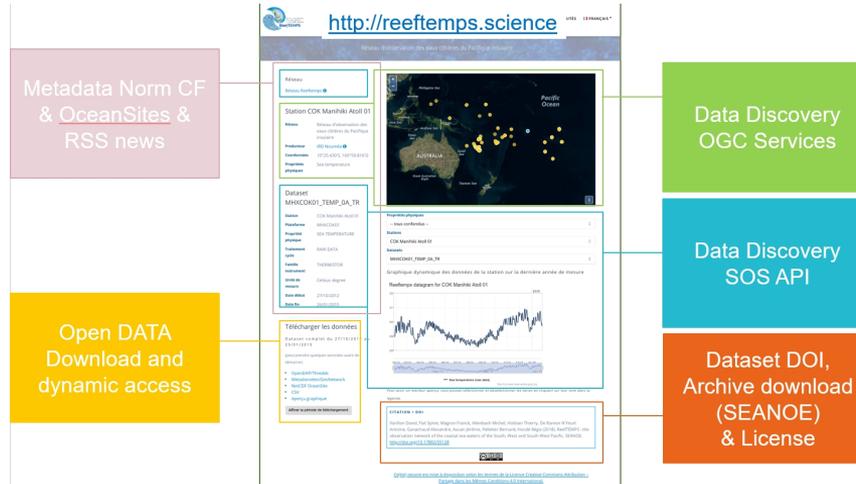




- Accès ouvert aux données / open access
- Ancrage des données dans le bassin Pacifique & alimentation des SI nationaux en 2<sup>nd</sup>e intention
- Services WEB accès / consultation data & interopérabilité : services web services normés, respectueux des standards, utilisation de référentiels
- Utilisation de solutions open-source (avec peu de développements spécifiques pour faciliter les évolutions)



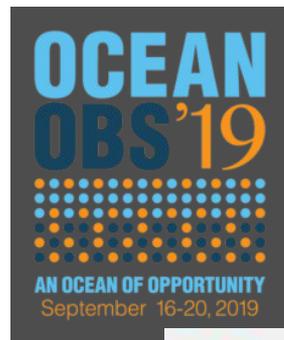
- Développer le « porter à connaissance » / Effort de cataloguage (métadonnées à différents niveaux)
- Multiplication des voies d'accès pour « toucher » les différentes communautés d'utilisateurs



# Des choix stratégiques forts à la genèse de ReefTEMPS - 2010



- Documenter et valoriser le travail dans l'esprit de partager le retour d'expérience (articles, colloques...)



- FAIR... avant l'acronyme !

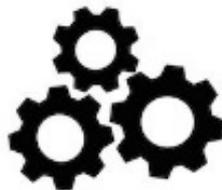
F  
indable



A  
ccessible



I  
nteroperable



R  
eusable



# Des choix stratégiques forts à la genèse de ReefTEMPS - 2010



- Le système a évolué depuis 2010
  
- FOCUS sur la situation actuelle  
(data management / organisation du SI)

# Cycle des données

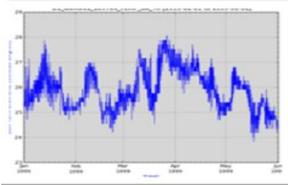
Chaque plateforme: instrument(s) mono / multi-paramètre(s)



Pose des  
capteurs

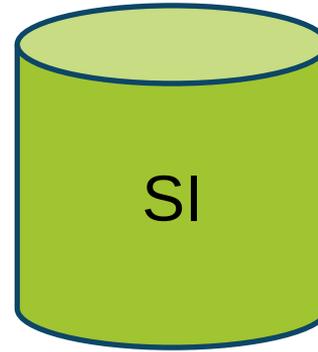
Relève / remplacement  
(6 mois, 1 an, 2 ans selon site)

Décharge mémoire:  
1 cycle de données brutes (OA)

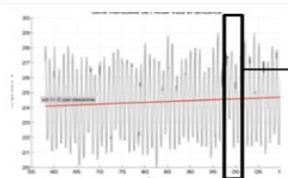


Qualification  
Cycle (ex: 1B)

Importation  
NetCDF  
OceanSites



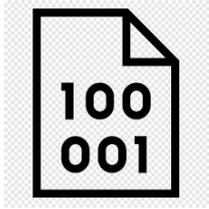
Dataset (série  
de données)



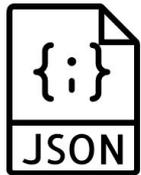
Qualification (chercheur)  
Série historique (ex: 2C+)

Services  
- Découverte  
- Visualisation  
- Diffusion  
- Accès  
- ...

# Données



Ascii ou format  
propriétaire  
sondes



Web services

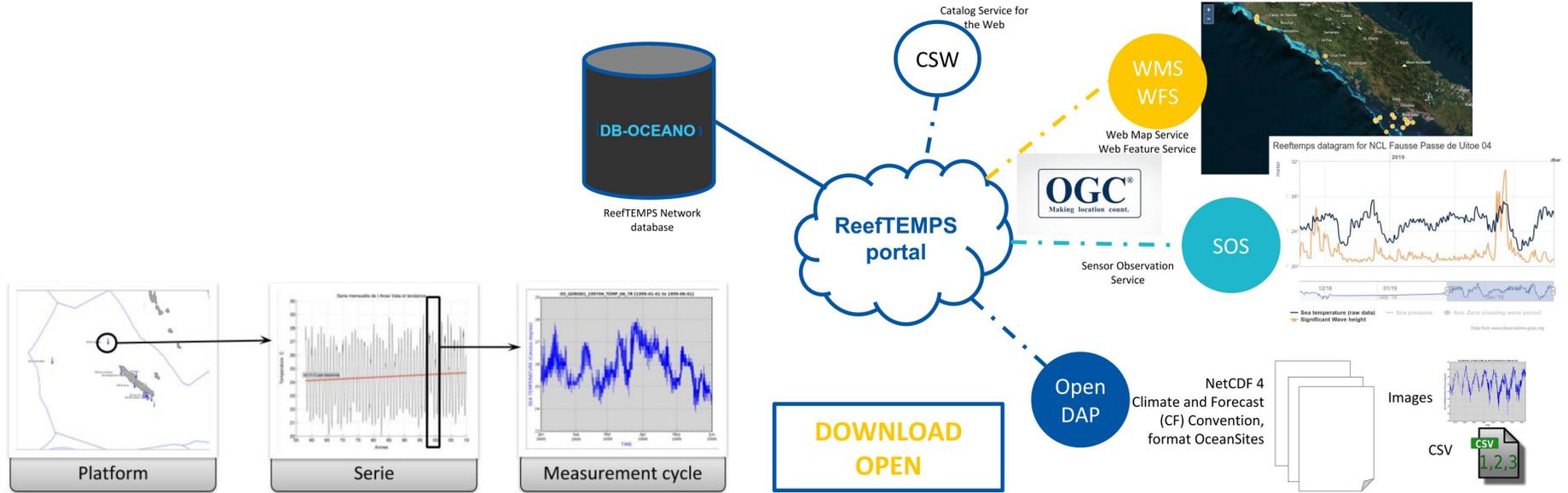


Convention Climate & Forecast

Format OceanSite

Vocabulaire Coremo / Ifremer

# Stratégie





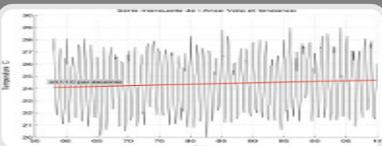
## Pérennité

- Assurer la pérennité des données dans une logique d'entrepôt ou centre de données virtuel



## Accessibilité

- Rendre les données accessibles et validées à la communauté
  - le plus rapidement possible
  - avec un libre accès



## Diffusion

- Produire et diffuser des cartes et indicateurs
  - par agrégation de ces données
  - au moyen d'interfaces graphiques interactives



## Interopérabilité

- Être interopérable et alimenter en données les banques de données
  - Nationales Ex: CORIOLIS
  - Européennes Ex: SeaDataNet,
  - Régionales du Pacifique Sud Ex : SOPAC, PI-GOOS, **IMOS**
  - Internationales

# Stratégie (Extrait présentation journée OBLIC 2019)



## Findable ↔ Trouvable

- Assurer la continuité des données dans un entrepôt virtuel ou un centre de données logique
- Diffuser les données dans les catalogues



## Accessible ↔ Accessible

- Rendre les données accessibles et validées à la communauté



## Interoperable ↔ Interopérable

- Être interopérables et fournir des données aux entrepôts de données
  - France Ex: CORIOLIS
  - Europe Ex: SeaDataNet,
  - Pacifique Sud, International Ex : SOPAC, PI-GOOS, **IMOS**

## How to cite

Varillon David, Fiat Sylvie, Magron Franck, Allenbach Michel, Hoibian Thierry, De Ramon N'Yeurt Antoine, Ganachaud Alexandre, Aucan Jérôme, Pelletier Bernard, Hocdé Régis (2018). ReefTEMPS : The Pacific Island coastal ocean observation network. SEANCE. <https://doi.org/10.17182/55128>

## Reusable ↔ Réutilisable

- Produire et diffuser des cartes et des indicateurs
- Licence d'utilisation des données claire et accessible

# FAIR

## FINDABLE

**doi:10.17882/55128**

Unique and persistent identifier

SEANOE

Bi-annual updates

September 2019 update :

**doi:10.17882/55128#66815**

Findable by data generic search engines

## ACCESSIBLE

HTTP

HTTPS



Access through standards

**DOWNLOAD & ACCESS OPEN**

No registration, no restriction, no constraints, no fees

## INTEROPERABLE



Web Map Service  
Web Feature Service



Sensor Observation Service



Catalog Service for the Web



Open-source Project for a Network Data Access Protocol

NetCDF 4 Climate and Forecast (CF) Convention, format OceanSites



ReefTEMPS datagram for NCL Fausse Passe de Ultee O4



## REUSABLE

Rich metadata & multiple layers

- Datasets metadata
- Data quality control flags
- Sensors metadata
- Observation service metadata

Provenance / Citation

How to cite

Varillon David, Fiat Sylvie, Magron Franck, Allenbach Michel, Holban Thierry, De Ramon N'Keut Antoine, Gombault Alexandra, Auzan Jerome, Pelletier Bernard, Picoté Régis (2018). ReefTEMPS: The Pacific Island coastal ocean observation network. SEANOE. <https://doi.org/10.17882/55128>

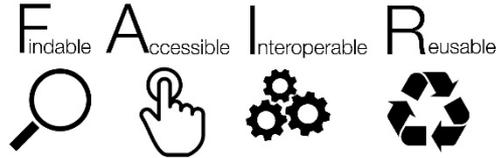
Data usage licence



Creative Commons Attribution – ShareAlike 4,0 International

# Principes FAIR

« As open as possible as closed as necessary »



Selon le principe des données ouvertes et du FAIR, toutes les données de ReefTEMPS sont mises à disposition gratuitement par le biais de services web utilisés pour la visualisation, l'accès et/ou le téléchargement, sous la licence Creative Commons "Attribution-Share alike" (CC-BY-SA) : <https://www.reeftemps.science/data>

Fiat, S., Aucan J., Varillon D., Hocdé R. ReefTEMPS, FAIRs access to reef ecosystem environmental measurements. IMDIS 2020.

**ReefTEMPS, FAIRs access to reef ecosystem environmental measurements**  
 Sylvie Fiat<sup>1</sup>, Jérôme Aucan<sup>2</sup>, David Varillon<sup>3</sup>, Régis Hocdé<sup>4</sup>

ReefTEMPS<sup>1</sup> is a coastal ocean observatory in the South, South West and West Pacific that provides long-term monitoring of climate change and its effects on the status of coral reefs and their resources. The network has been deploying sensors for temperature, pressure, conductivity, fluorescence and/or turbidity at 98 sites throughout the coastal zone of some 20 island states and territories since 1958.

ReefTEMPS, labelled Service National (for) Observation (SNO), is part of the French research infrastructure "coastal ocean and nearshore observations" IR ILICO<sup>2</sup>.

<http://reeftemps.science> [www.ir-ilico.fr](http://www.ir-ilico.fr)

60 years, 63 M measures, 98 platforms, 5 physical parameters







FINDABLE	ACCESSIBLE	INTEROPERABLE	REUSABLE
<p>Unique and persistent identifier</p> <p><a href="https://doi.org/10.17882/35130">doi:10.17882/35130</a></p> <p>SEANEGE</p> <p>Bi-annual updates</p> <p>Subscriber identifier: <a href="https://doi.org/10.17882/35130/389665">doi:10.17882/35130/389665</a></p> <p>Findable by data generic search engines</p>	<p>HTTP HTTPS</p> <p>OGC</p> <p>Access through standards</p> <p>DOWNLOAD &amp; ACCESS OPEN</p> <p>No registration, no restriction, no constraints, no fees</p>	<p>Web Map Service / WFS / Sensor</p> <p>SOS Sensor Observation Service</p> <p>CSW Catalogue Service for the Web</p> <p>Open Data Protocol</p> <p>Open source projects like: OpenStreetMap, OpenLayers, OpenLayers</p> <p>netCDF &amp; Climate and Forecast Conventions</p>	<p>Rich metadata &amp; multiple layers</p> <p>Observation metadata</p> <p>Data quality control logs</p> <p>Sensor metadata</p> <p>Observation service metadata</p> <p>Provenance / Citation</p> <p>Data usage licence</p> <p>CC BY SA</p> <p>Creative Commons Attribution-ShareAlike International</p>

**FAIR, SUSTAINABLE DEVELOPMENT**  
 20 island states and overseas territories of the Pacific

Long-term monitoring

Natural disasters studying

Open source software architecture

Figure 6: Effect of reef protection (Reef Reserves)

Figure 7: Wave height during tropical cyclones

Figure 8: ReefTAPs permanent citizen-shipment

Figure 9: Global warming evidence

Figure 10: Population density (2010) and population growth rate (2000-2010)

Figure 11: Population density (2010) and population growth rate (2000-2010)

Figure 12: Population density (2010) and population growth rate (2000-2010)

Figure 13: Population density (2010) and population growth rate (2000-2010)

Figure 14: Population density (2010) and population growth rate (2000-2010)

Figure 15: Population density (2010) and population growth rate (2000-2010)

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Figure 96: Population density (2010) and population growth rate (2000-2010)

Figure 97: Population density (2010) and population growth rate (2000-2010)

Figure 98: Population density (2010) and population growth rate (2000-2010)

Figure 99: Population density (2010) and population growth rate (2000-2010)

Figure 100: Population density (2010) and population growth rate (2000-2010)

# DOI



Le jeu de données complet de ReefTEMPS est également disponible via l'entrepôt de données SEANOE et mis à jour chaque semestre.

<https://doi.org/10.17882/55128>.

## How to cite

Varillon David, Fiat Sylvie, Magron Franck, Allenbach Michel, Hoibian Thierry, de Ramon N'Yeurt Antoine, Ganachaud Alexandre, Aucan Jérôme, Pelletier Bernard, Hocdé Régis (2022). ReefTEMPS : The Pacific Island coastal ocean observation network. SEANOE. <https://doi.org/10.17882/55128>

SEANOE Sea scientific open data edition



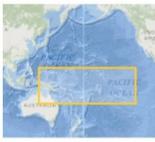
## ReefTEMPS : The Pacific Island coastal ocean observation network

Date	2022-03
Temporal extent	1958-01-01 - 2021-09-28
Author(s)	Varillon David <sup>1</sup> , Fiat Sylvie <sup>2</sup> , Magron Franck <sup>4</sup> , Allenbach Michel <sup>5</sup> , Hoibian Thierry <sup>7</sup> , de Ramon N'Yeurt Antoine <sup>8</sup> , Ganachaud Alexandre <sup>9</sup> , Aucan Jérôme <sup>9</sup> , Pelletier Bernard <sup>9</sup> , Hocdé Régis <sup>9</sup>
Contributor(s)	Brisebarat Guillaume, Andriatiana Andry, Grelet Jacques, Bachelier Céline
Affiliation(s)	1 : US IMAGO, IRD, Nouméa, Nouvelle-Calédonie 2 : ENTROPIE, IRD, Univ Réunion, CNRS, Nouméa, Nouvelle-Calédonie 3 : OSU OMP, Toulouse, France 4 : CPS, Nouméa, Nouvelle-Calédonie 5 : UNC, Nouméa, Nouvelle-Calédonie 6 : USP PACE-SD, Fiji 7 : LEGOS, IRD, Toulouse, France / Nouméa, Nouvelle-Calédonie 8 : GEACIUR, IRD, Nouméa, Nouvelle-Calédonie 9 : MARBEC, IRD, Univ Montpellier, CNRS, Ifremer, Montpellier, France
DOI	10.17882/55128
Publisher	SEANOE
Abstract	ReefTEMPS is a sensors network initiated in 1958 to monitor the coastal area of the South, West and South-West Pacific. This long-term observatory allows the acquisition of several parameters: Sea temperature, Electrical conductivity / practical salinity, Sea pressure / Waves height & period / sea level, Fluorescence, Turbidity, with high or medium frequency (from 1 second to 30 minutes). The main objective is to study the climatic parameters of the tropical ocean with a focus on the coastal sea waters to monitor the long-term effects of the global change and its impacts on the coral reefs and their resources. ReefTEMPS is part of the French national federative Research Infrastructure for coastal ocean and seashore observations named ILLICO. It is an observation service operated by ENTROPIE since 2019 (and before by the GOPS (South Pacific Integrated observatory for the environment, terrestrial and marine biodiversity) in 2010-2017 and by LEGOS in 2018). FOUR operators each manage a sub-region: ENTROPIE/IRD: New-Caledonia (New-Caledonia and Vanuatu), University of New-Caledonia (Nouville and Futuna), University of the South Pacific (USP) (Fiji) and the Pacific community (SPC) (Pacific States). ReefTEMPS include a sensors-oriented environmental information system. It provides different types of interoperable services (including OGC standard SOS - Sensor Observation Service), each tailored to a specific scientific users community. The measurements provided by sensors, deployed for more than 40years for some, are stored in a dedicated database designed by US IMAGO in the late 2000s. By aggregating historical IRD stations, ReefTEMPS provides very long time series exceeding 60 years. All data acquired are publicly accessible without any restriction (under CC-BY licence). The extracted data are accessible from this ReefTEMPS landing page with a downloadable ZIP file. All the data acquired, including the most recent data, are accessible from the ReefTEMPS data portal and through the different ReefTEMPS web services. The ZIP archive contains all ReefTEMPS data acquired since 1958 to the last update, for all parameters, and with different quality levels (from RAW to historical series). The ZIP archive

Click to download the data 



IRD / Jean-Michel Bonil - Temperature sensor survey: intervention by Bertrand Bourgeois, diver at the SEOH (Sperbarb: Operations Decoups Service) in the Passe d'Ouarai, in New Caledonia.



Download metadata TXT, RIS, XLS, RTI, BIBTEX

### References

Maggioli Federica, Pujo Puy Mirella, Aucan Jérôme, Cerrano Carlo, Calcina Barbara, Payri Claude, Benzioni Francesca, Letourneur Yves, Rodolfo Menaja Riccardo (2021) The Bouraki semi-enclosed lagoon (New Caledonia): A natural laboratory to study the life-long adaptation of a coral reef ecosystem to climate change-like conditions. Biogeosciences, 18(18), 5117-5140.  
Roger Jean, Pelletier Bernard, Hocdé Régis, Varillon David

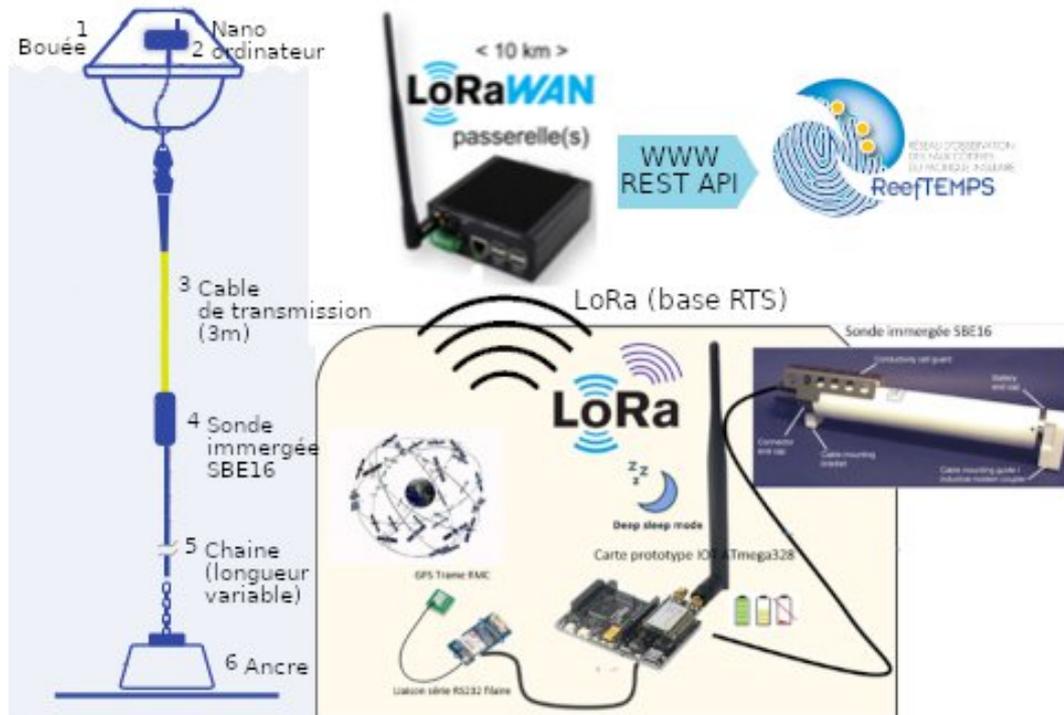
# Evolutions et perspectives



- Intérêt du temps-réel (ou semi-différé)
- Approche Low-Co(a)st – ex: transmission data par IoT LoRaWAN

## ④ Retour d'expérience: bouée prototype ReefTEMPS

développée dans l'esprit 'Cost-effective / Open source / Accessible / Sustainable Technologies'



Prototype fonctionnel et opérationnel

## ReefTEMPS Data

Améliorations suggérées au site "" :



- 1) Langue par défaut en anglais ? Ou sinon titre d'accueil bilingue ? Mettre "SST Data", pour être plus clair. Le nom "Réseau d'observation..." n'indique pas en fait le type de données disponible, qui est la Température (SST) - plus facile à rechercher sur les moteurs de recherche avec ces mots clés.
- 2) Présentation de la carte : un minimum d'explication en haut, par. ex "Chaque point sur la carte représente une station SST ReefTEMPS, zoomer / cliquer dessus pour voir les données disponibles" (en anglais et en français).
- 3) Afficher le nom des stations (Pays!) à côté des points. Ne pas utiliser des noms techniques cabalistiques de stations, les utilisateurs de la région doivent avoir en outil simple et facile à comprendre.
- 4) Ne pas afficher à l'accueil une station par défaut (e.g. Cook ) car cela distraie du fait qu'il y a un nombre de stations disponibles.
- 5) Quand on clique sur une station, afficher d'abord en clair sur la barre latérale gauche le Pays, le site, la durée d'observation (e.g. 2012-2023) puis après seulement, le code de site qui a le moins d'importance pour les utilisateurs externes. Juste après, "Download data" et ensuite les Metadata (pas l'inverse).
- 6) Ne pas mélanger l'anglais et le français dans les metadata.