# TERRITORIES LIBRARY DATABASE (TLD)

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(v1.0)

This project has received funding from the Euratom research and training programme 2014-2018 under grant agreement No 662287.

# Introduction

- Overview of TERRITORIES WP1
- Data to be included in TLD
- Technical details of TLD
- How data is managed
- How to access the data
- Intended uses for TLD in WP1

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# Overview of TERRITORIES WP1

- We have two principal requirements of the TLD:
  - input to guidance on optimisation of monitoring and support of remediation
    - Guidance will be developed taking into account experience gained from the implementation of monitoring campaigns at the sites included in the TLD
  - input to guidance on model selection and model evaluation.
    - Marine dispersion model validation using Sellafield particles data as well as normal authorised discharge data
    - Coniferous tree model using data from Belgium NORM site
    - Coniferous and deciduous forest models using Fukushima data
    - Plant/biota modelling eg ERICA using Norwegian fen site

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# Data to be included in TLD

| Site | Quantity | Spatial | Temporal | Nuclides |
|---|---|---|---|---|
| **Belgium NORM (SCK-CEN)** | Ambient dose rate | Yes | All in 1 day | Gross |
| | Plant concentrations | No | No | By nuclide |
| | Soil concentrations | No | Limited | By nuclide |
| **Fukushima Evergreen Coniferous (IRSN)** | Plant concentration ratio | No | Yes | Cs-137 |
| | Soil concentration ratio | No | Yes | Cs-137 |
| | Meteorological Data | No | Yes | Cs-137 |
| **Fukushima Deciduous Broadleaf (IRSN)** | Plant concentration ratio | No | Yes | Cs-137 |
| | Soil concentration ratio | No | Yes | Cs-137 |
| | Meteorological Data | No | Yes | Cs-137 |
| **Fen Norway ambient (NRPA)** | Ambient dose rate | Yes | No | Gross |
| | Soil concentrations | Limited | No | By nuclide |
| **Fen complex Norway (NRPA)** | Ambient dose rate | Yes | Yes | Gross |
| | Animal concentrations | Limited | No | By nuclide |
| | Plant concentrations | Limited | Limited | By nuclide |
| | Soil concentrations | Yes | Yes | By nuclide |
| **Sellafield particles (PHE)** | Finds (particles and objects) | Yes | Yes | By nuclide |

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# Data to be included in TLD

| Site | Quantity | Spatial | Temporal | Nuclides |
|---|---|---|---|---|
| **Fukushima ambient dose rates (IRSN)** | Ambient dose rate | Yes | Yes | Cs-134/Cs-137 |
| **Additional Sellafield measurements** | Seawater, sediment, fish, crustaceans, molluscs, seaweed concentrations | Yes | Yes (1997 – 2002) | H-3<br>Tc-99<br>Cs-137<br>Pu-239/240<br>Am-241 |

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# Technical details

- Database has been built using Firebird
  - TLD 20-11-17.FDB
- User interface built using Delphi.
  - TLDReader.exe
  - fbclient.dll, ib_util.dll, icudt30.dll, icuin30.dll, icuuc30.dll
- Published on CONCERT website:

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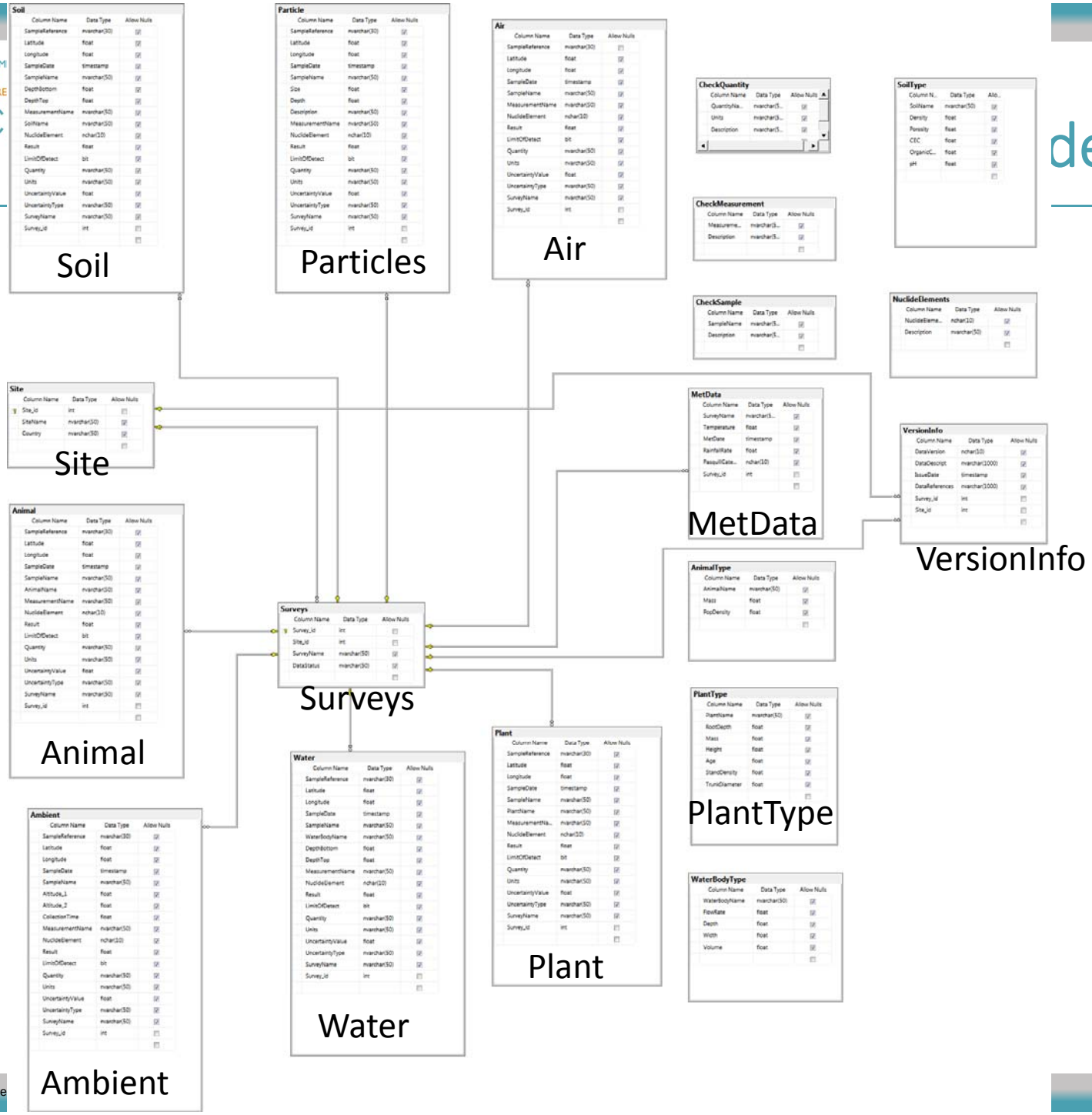
# details

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# Technical details

**VersionInfo**

| Column Name | Data Type | Allow Nulls |
|---|---|---|
| DataVersion | nchar(10) | ☑ |
| DataDescript | nvarchar(1000) | ☑ |
| IssueDate | timestamp | ☑ |
| DataReferences | nvarchar(1000) | ☑ |
| Survey_id | int | ☐ |
| Site_id | int | ☐ |
| | | ☐ |

**Site**

| Column Name | Data Type | Allow Nulls |
|---|---|---|
| 🔑 Site_id | int | ☐ |
| SiteName | nvarchar(50) | ☑ |
| Country | nvarchar(50) | ☑ |
| | | ☐ |

**Surveys**

| Column Name | Data Type | Allow Nulls |
|---|---|---|
| 🔑 Survey_id | int | ☐ |
| Site_id | int | ☐ |
| SurveyName | nvarchar(50) | ☑ |
| DataStatus | nvarchar(50) | ☑ |
| | | ☐ |

**Plant**

| Column Name | Data Type | Allow Nulls |
|---|---|---|
| SampleReference | nvarchar(30) | ☑ |
| Latitude | float | ☑ |
| Longitude | float | ☑ |
| SampleDate | timestamp | ☑ |
| SampleName | nvarchar(50) | ☑ |
| PlantName | nvarchar(50) | ☑ |
| MeasurementNa... | nvarchar(50) | ☑ |
| NuclideElement | nchar(10) | ☑ |
| Result | float | ☑ |
| LimitOfDetect | bit | ☑ |
| Quantity | nvarchar(50) | ☑ |
| Units | nvarchar(50) | ☑ |
| UncertaintyValue | float | ☑ |
| UncertaintyType | nvarchar(50) | ☑ |
| SurveyName | nvarchar(50) | ☑ |
| Survey_id | int | ☐ |
| | | ☐ |

Plant table currently holds 2372 records. Total of about 33000 measurement records.

**PlantType**

| Column Name | Data Type | Allow Nulls |
|---|---|---|
| PlantName | nvarchar(50) | ☑ |
| RootDepth | float | ☑ |
| Mass | float | ☑ |
| Height | float | ☑ |
| Age | float | ☑ |
| StandDensity | float | ☑ |
| TrunkDiameter | float | ☑ |
| | | ☐ |

**MetData**

| Column Name | Data Type | Allow Nulls |
|---|---|---|
| SurveyName | nvarchar(5... | ☑ |
| Temperature | float | ☑ |
| MetDate | timestamp | ☑ |
| RainfallRate | float | ☑ |
| PasquillCate... | nchar(10) | ☑ |
| Survey_id | int | ☐ |
| | | ☐ |

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# How data is managed

- Receipt of data
  - Receive data in Excel workbook. Worksheets:
    - VersionInfo
    - Site
    - Surveys
    - Air, Ambient, Animal, Particle, Plant, Soil and Water
    - AnimalType, PlantType, SoilType, WaterBodyType
    - Metdata
    - Checklists
  - PHE review data and record any amendments

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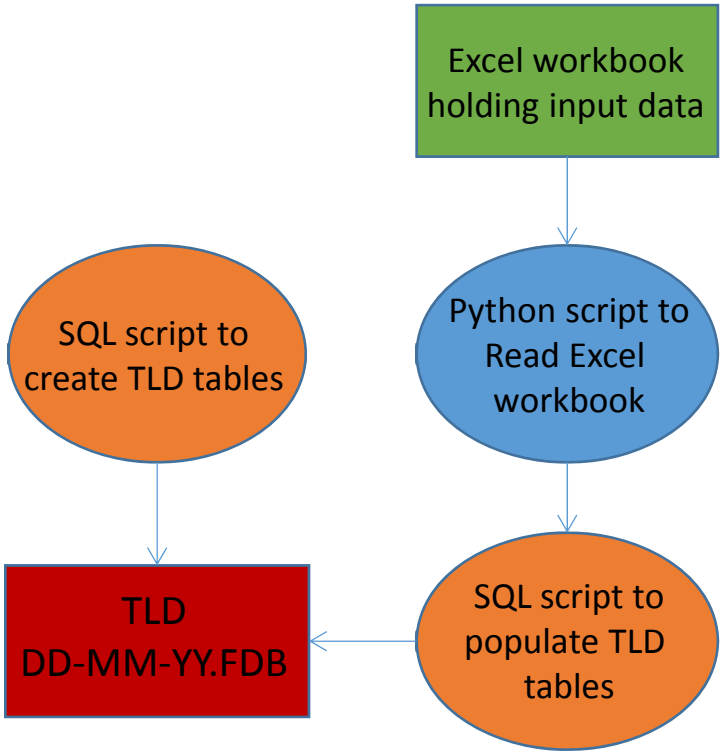
# How data is managed

- Populating TLD
  - Run SQL to create TLD tables
  - Run Python script to read Excel workbook and create SQL for populating TLD
  - Run SQL to populate TLD
  - Save the TLD as:

    TLD ‘DD-MM-YY’.FDB
  - Publish updates on website

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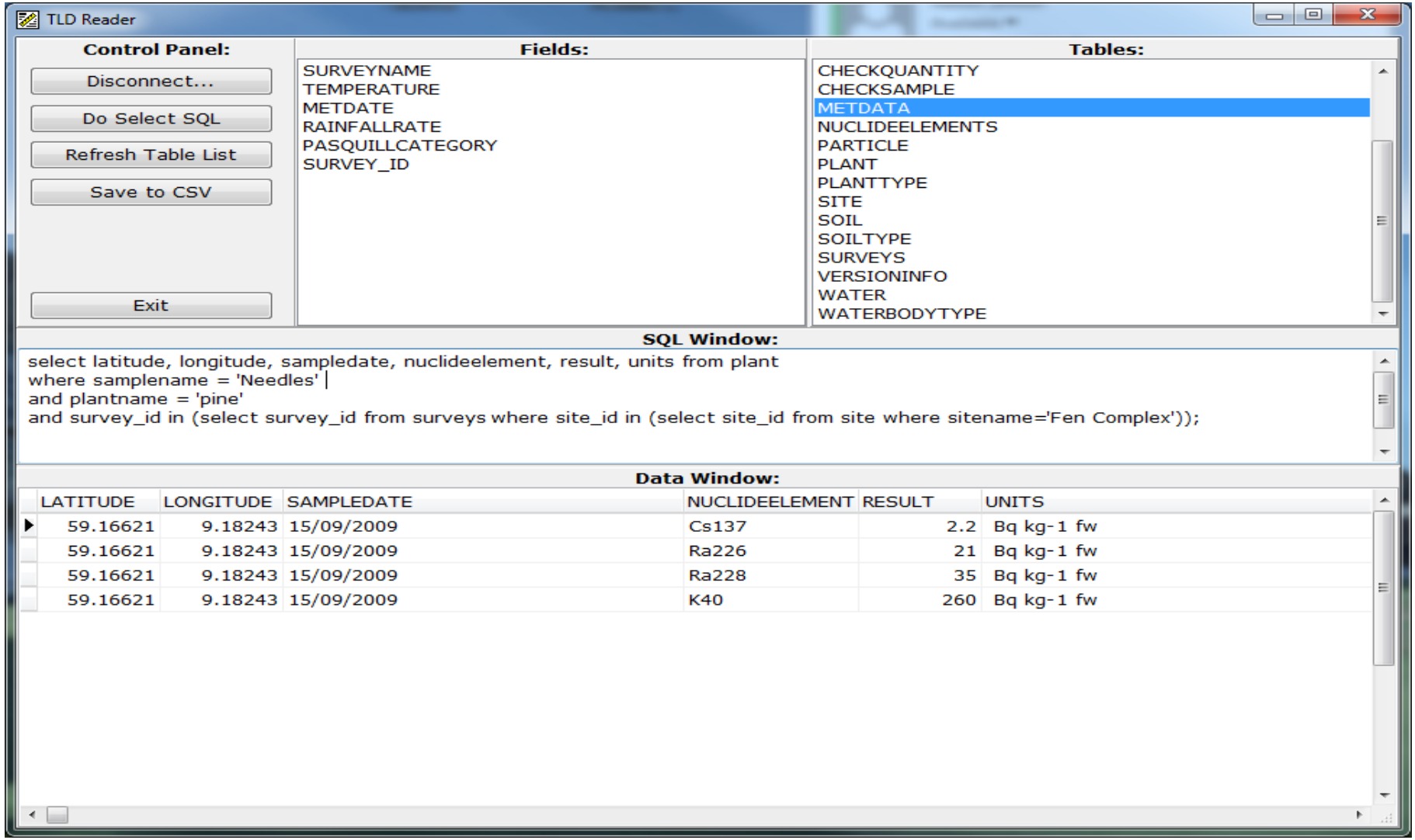
# How to access the data

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# Intended uses for TLD
## Example 1 – distribution of particles

- Select data from Sellafield particles dataset

```
select Latitude, Longitude, SampleDate, SampleName,
Description, Result, Units from Particle
where survey_id = 17
and Description = 'Beta Rich'
and LimitOfDetect = 'N'
and Result > 0
and sampledate < CAST('1.1.2008' AS DATE)
and sampledate > CAST('31.12.2006' AS DATE)
order by sampledate;
```

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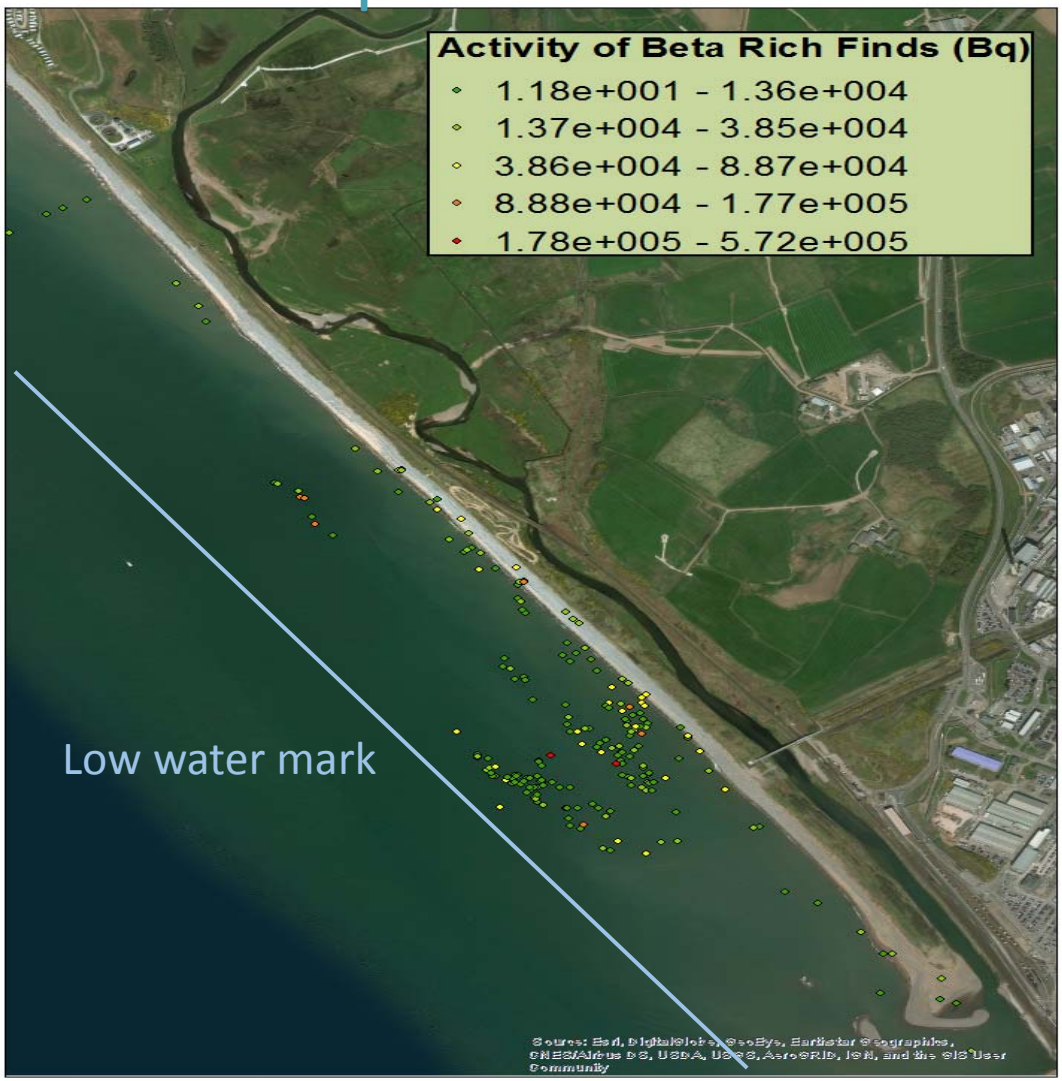
# Intended uses for TLD
# Example 1 – distribution of particles

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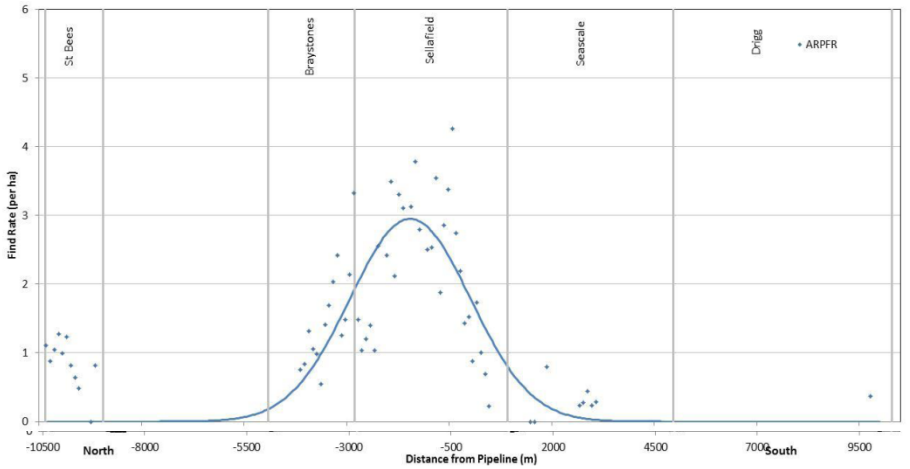
# Intended uses for TLD
# Example 1 – distribution of particles

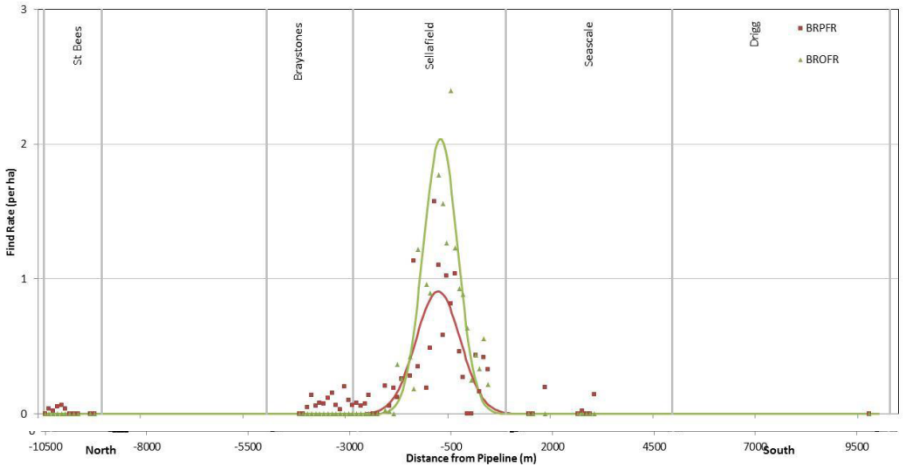
- Possible models MOPER, ARCTICMAR-19 (NRPA box model)
  - These models will include functionality to model dispersing particles in the marine environment and the intertidal region
  - Although the source term of the particles (ie actual quantities of particles released and the timing of these releases) is uncertain simple assumption will be used to see if trends in beach finds can be reproduced using the models.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/634866/PiE_Annual_Report_2016_17_FINAL_Compressed.pdf

Alpha rich finds




Beta rich finds

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# Intended uses for TLD
# Example 2 – forest model

- Select data from Fukushima broadleaf forest dataset

```
select sampledate, result, rainfallrate from plant, metdata
where plant.survey_id = 1
and metdata.survey_id = 1
and samplename = 'Throughfall'
and result > '-1' and rainfallrate > '-1'
and plant.sampledate = metdata.metdate;
```

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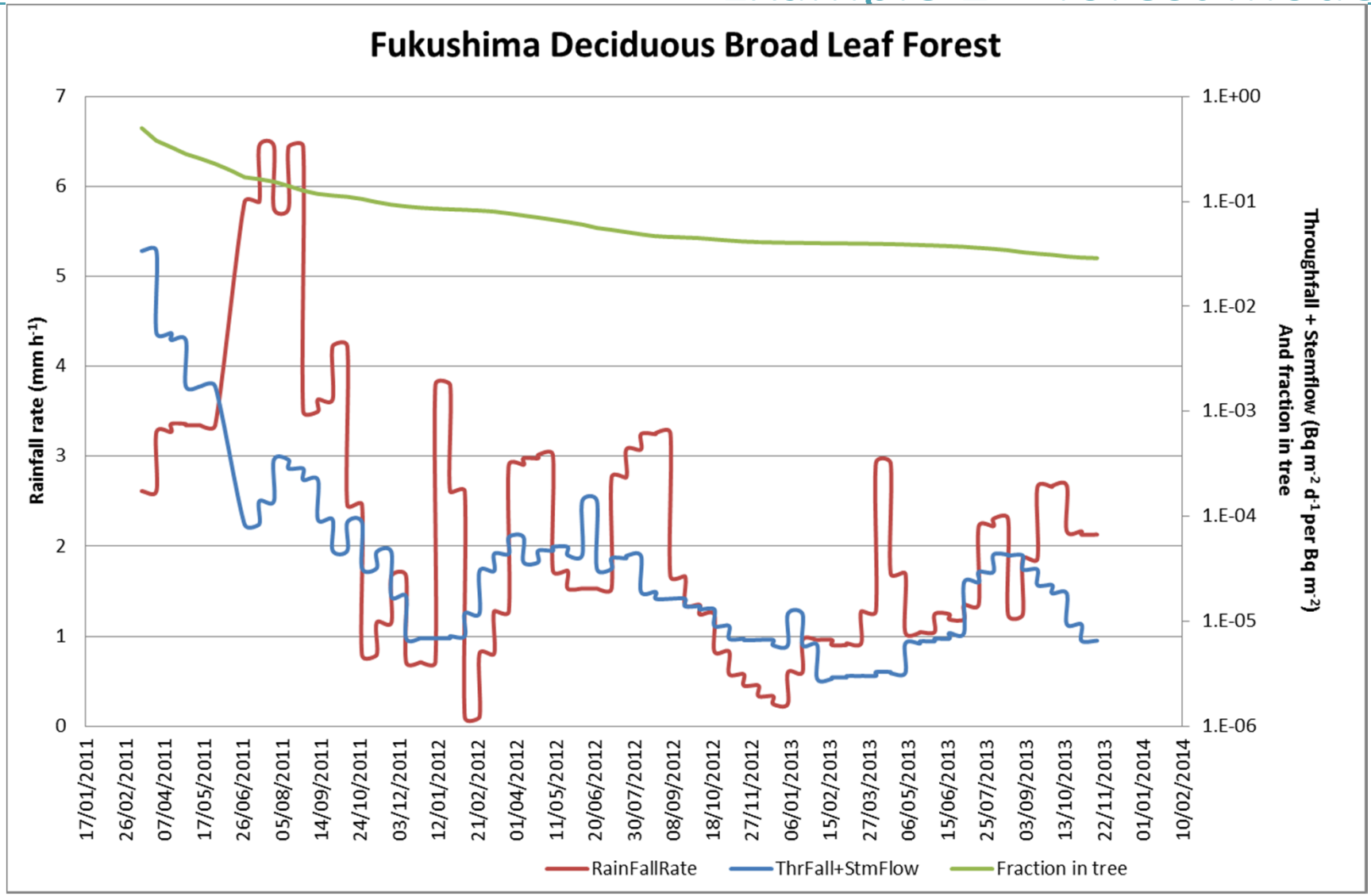
# Intended uses for TLD
# Example 2 – forest model

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# Intended uses for TLD Example 2 – forest model

- IRSN plan to use Fukushima 'site averaged' data to test an existing ("*simple*") then an improved ("*advanced*") modelling approach for predicting Cs transfer and air dose rates in very forested terrestrial environments
- Quantify the improvement and discuss models complexity

- Identify and quantify sources of uncertainty/variability in the "*advanced*" model and Fukushima data, including spatial aspects
- Perform SA/UA in a selected 20x20 $km^2$ area. This will involve the estimation of uncertainties in the deposition levels used as input to the forest model which are derived using geostatistical modelling of raw airborne data (ie dose rates + estimated deposit at ground surface)

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Any questions?

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