

TERRITORIES LIBRARY DATABASE (TLD)

Justin Smith
Public Health England

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(v1.0)

- 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

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

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

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 Tc-99 Cs-137 Pu-239/240 Am-241

- 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:

Column Name	Data Type	Allow Nulls
SampleReference	nvarchar(30)	[0]
Latitude	float	[0]
Longitude	float	[0]
SampleDate	timestamp	[0]
SampleName	nvarchar(50)	[0]
DepthBottom	float	[0]
DepthTop	float	[0]
MeasurementName	nvarchar(50)	[0]
SoilName	nvarchar(50)	[0]
NuclideElement	nchar(30)	[0]
Result	float	[0]
LimitOfDetect	bit	[0]
Quantity	nvarchar(50)	[0]
Units	nvarchar(50)	[0]
UncertaintyValue	float	[0]
UncertaintyType	nvarchar(50)	[0]
SurveyName	nvarchar(50)	[0]
SurveyId	int	[1]

Soil

Column Name	Data Type	Allow Nulls
SampleReference	nvarchar(30)	[0]
Latitude	float	[0]
Longitude	float	[0]
SampleDate	timestamp	[0]
SampleName	nvarchar(50)	[0]
Size	float	[0]
Depth	float	[0]
Description	nvarchar(50)	[0]
MeasurementName	nvarchar(50)	[0]
NuclideElement	nchar(30)	[0]
Result	float	[0]
LimitOfDetect	bit	[0]
Quantity	nvarchar(50)	[0]
Units	nvarchar(50)	[0]
UncertaintyValue	float	[0]
UncertaintyType	nvarchar(50)	[0]
SurveyName	nvarchar(50)	[0]
SurveyId	int	[1]

Particles

Column Name	Data Type	Allow Nulls
SampleReference	nvarchar(30)	[1]
Latitude	float	[0]
Longitude	float	[0]
SampleDate	timestamp	[0]
SampleName	nvarchar(50)	[0]
MeasurementName	nvarchar(50)	[0]
NuclideElement	nchar(30)	[0]
Result	float	[0]
LimitOfDetect	bit	[0]
Quantity	nvarchar(50)	[0]
Units	nvarchar(50)	[0]
UncertaintyValue	float	[0]
UncertaintyType	nvarchar(50)	[0]
SurveyName	nvarchar(50)	[0]
SurveyId	int	[1]

Air

Column Name	Data Type	Allow Nulls
Quantity	nvarchar(50)	[0]
Units	nvarchar(50)	[0]
Description	nvarchar(50)	[0]

Column Name	Data Type	Allow Nulls
Measurement	nvarchar(50)	[0]
Description	nvarchar(50)	[0]

Column Name	Data Type	Allow Nulls
SampleName	nvarchar(50)	[0]
Description	nvarchar(50)	[0]

Column Name	Data Type	Allow Nulls
SoilName	nvarchar(50)	[0]
Density	float	[0]
Porosity	float	[0]
CEC	float	[0]
OrganicC	float	[0]
pH	float	[0]

details

Column Name	Data Type	Allow Nulls
SiteId	int	[1]
SiteName	nvarchar(50)	[0]
Country	nvarchar(50)	[0]

Site

Column Name	Data Type	Allow Nulls
SampleReference	nvarchar(30)	[0]
Latitude	float	[0]
Longitude	float	[0]
SampleDate	timestamp	[0]
SampleName	nvarchar(50)	[0]
AnimalName	nvarchar(50)	[0]
MeasurementName	nvarchar(50)	[0]
NuclideElement	nchar(30)	[0]
Result	float	[0]
LimitOfDetect	bit	[0]
Quantity	nvarchar(50)	[0]
Units	nvarchar(50)	[0]
UncertaintyValue	float	[0]
UncertaintyType	nvarchar(50)	[0]
SurveyName	nvarchar(50)	[0]
SurveyId	int	[1]

Animal

Column Name	Data Type	Allow Nulls
SurveyId	int	[1]
SiteId	int	[1]
SurveyName	nvarchar(50)	[0]
DataStatus	nvarchar(50)	[0]

Surveys

Column Name	Data Type	Allow Nulls
SampleReference	nvarchar(30)	[0]
Latitude	float	[0]
Longitude	float	[0]
SampleDate	timestamp	[0]
SampleName	nvarchar(50)	[0]
WaterBodyName	nvarchar(50)	[0]
DepthBottom	float	[0]
DepthTop	float	[0]
MeasurementName	nvarchar(50)	[0]
NuclideElement	nchar(30)	[0]
Result	float	[0]
LimitOfDetect	bit	[0]
Quantity	nvarchar(50)	[0]
Units	nvarchar(50)	[0]
UncertaintyValue	float	[0]
UncertaintyType	nvarchar(50)	[0]
SurveyName	nvarchar(50)	[0]
SurveyId	int	[1]

Water

Column Name	Data Type	Allow Nulls
SampleReference	nvarchar(30)	[0]
Latitude	float	[0]
Longitude	float	[0]
SampleDate	timestamp	[0]
PlantName	nvarchar(50)	[0]
MeasurementName	nvarchar(50)	[0]
NuclideElement	nchar(30)	[0]
Result	float	[0]
LimitOfDetect	bit	[0]
Quantity	nvarchar(50)	[0]
Units	nvarchar(50)	[0]
UncertaintyValue	float	[0]
UncertaintyType	nvarchar(50)	[0]
SurveyName	nvarchar(50)	[0]
SurveyId	int	[1]

Plant

Column Name	Data Type	Allow Nulls
SurveyName	nvarchar(50)	[0]
Temperature	float	[0]
MetDate	timestamp	[0]
RainfallRate	float	[0]
PassoutGate	nchar(30)	[0]
SurveyId	int	[1]

MetData

Column Name	Data Type	Allow Nulls
AnimalName	nvarchar(50)	[0]
Mass	float	[0]
RodDensity	float	[0]

Column Name	Data Type	Allow Nulls
PlantName	nvarchar(50)	[0]
RootDepth	float	[0]
Mass	float	[0]
Height	float	[0]
Age	float	[0]
StandDensity	float	[0]
TrunkDiameter	float	[0]

PlantType

Column Name	Data Type	Allow Nulls
WaterBodyName	nvarchar(50)	[0]
FlowRate	float	[0]
Depth	float	[0]
Width	float	[0]
Volume	float	[0]

WaterBodyType


Column Name	Data Type	Allow Nulls
NuclideElement	nchar(30)	[0]
Description	nvarchar(50)	[0]


Column Name	Data Type	Allow Nulls
DecayVersion	nchar(30)	[0]
DataDescription	nvarchar(2000)	[0]
IssueDate	timestamp	[0]
DecayReference	nvarchar(5000)	[0]
SurveyId	int	[1]
SiteId	int	[1]

VersionInfo

Technical details

VersionInfo		
Column Name	Data Type	Allow Nulls
DataVersion	nchar(10)	<input checked="" type="checkbox"/>
DataDescript	nvarchar(1000)	<input checked="" type="checkbox"/>
IssueDate	timestamp	<input checked="" type="checkbox"/>
DataReferences	nvarchar(1000)	<input checked="" type="checkbox"/>
Survey_id	int	<input type="checkbox"/>
Site_id	int	<input type="checkbox"/>
		<input type="checkbox"/>

Site		
Column Name	Data Type	Allow Nulls
 Site_id	int	<input type="checkbox"/>
SiteName	nvarchar(50)	<input checked="" type="checkbox"/>
Country	nvarchar(50)	<input checked="" type="checkbox"/>
		<input type="checkbox"/>

Surveys		
Column Name	Data Type	Allow Nulls
 Survey_id	int	<input type="checkbox"/>
Site_id	int	<input type="checkbox"/>
SurveyName	nvarchar(50)	<input checked="" type="checkbox"/>
DataStatus	nvarchar(50)	<input checked="" type="checkbox"/>
		<input type="checkbox"/>

Plant		
Column Name	Data Type	Allow Nulls
SampleReference	nvarchar(30)	<input checked="" type="checkbox"/>
Latitude	float	<input checked="" type="checkbox"/>
Longitude	float	<input checked="" type="checkbox"/>
SampleDate	timestamp	<input checked="" type="checkbox"/>
SampleName	nvarchar(50)	<input checked="" type="checkbox"/>
PlantName	nvarchar(50)	<input checked="" type="checkbox"/>
MeasurementNa...	nvarchar(50)	<input checked="" type="checkbox"/>
NuclideElement	nchar(10)	<input checked="" type="checkbox"/>
Result	float	<input checked="" type="checkbox"/>
LimitOfDetect	bit	<input checked="" type="checkbox"/>
Quantity	nvarchar(50)	<input checked="" type="checkbox"/>
Units	nvarchar(50)	<input checked="" type="checkbox"/>
UncertaintyValue	float	<input checked="" type="checkbox"/>
UncertaintyType	nvarchar(50)	<input checked="" type="checkbox"/>
SurveyName	nvarchar(50)	<input checked="" type="checkbox"/>
Survey_id	int	<input type="checkbox"/>
		<input type="checkbox"/>

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

PlantType		
Column Name	Data Type	Allow Nulls
PlantName	nvarchar(50)	<input checked="" type="checkbox"/>
RootDepth	float	<input checked="" type="checkbox"/>
Mass	float	<input checked="" type="checkbox"/>
Height	float	<input checked="" type="checkbox"/>
Age	float	<input checked="" type="checkbox"/>
StandDensity	float	<input checked="" type="checkbox"/>
TrunkDiameter	float	<input checked="" type="checkbox"/>
		<input type="checkbox"/>

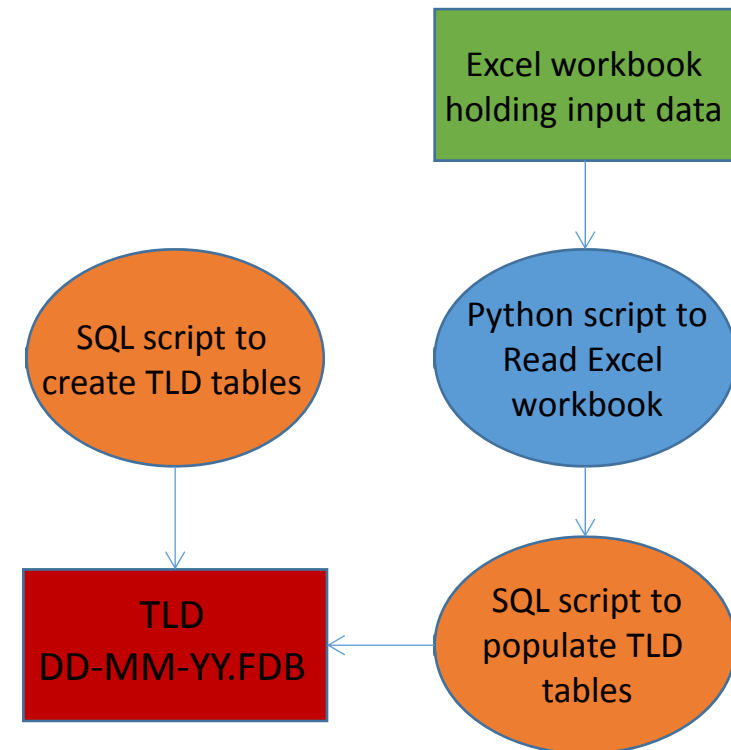
MetData		
Column Name	Data Type	Allow Nulls
SurveyName	nvarchar(50)	<input checked="" type="checkbox"/>
Temperature	float	<input checked="" type="checkbox"/>
MetDate	timestamp	<input checked="" type="checkbox"/>
RainfallRate	float	<input checked="" type="checkbox"/>
PasquillCate...	nchar(10)	<input checked="" type="checkbox"/>
Survey_id	int	<input type="checkbox"/>
		<input type="checkbox"/>

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

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



How to access the data

TLD Reader

Control Panel:
 Disconnect...
 Do Select SQL
 Refresh Table List
 Save to CSV
 Exit

Fields:
 SURVEYNAME
 TEMPERATURE
 METDATE
 RAINFALLRATE
 PASQUILLCATEGORY
 SURVEY_ID

Tables:
 CHECKQUANTITY
 CHECKSAMPLE
 METDATA
 NUCLIDEELEMENTS
 PARTICLE
 PLANT
 PLANTTYPE
 SITE
 SOIL
 SOILTYPE
 SURVEYS
 VERSIONINFO
 WATER
 WATERBODYTYPE

SQL Window:

```
select latitude, longitude, sampleddate, nuclideelement, result, units from plant
where samplename = 'Needles' |
and plantname = 'pine'
and survey_id in (select survey_id from surveys where site_id in (select site_id from site where sitename='Fen Complex'));
```

Data Window:

LATITUDE	LONGITUDE	SAMPLEDATE	NUCLIDEELEMENT	RESULT	UNITS
59.16621	9.18243	15/09/2009	Cs137	2.2	Bq kg-1 fw
59.16621	9.18243	15/09/2009	Ra226	21	Bq kg-1 fw
59.16621	9.18243	15/09/2009	Ra228	35	Bq kg-1 fw
59.16621	9.18243	15/09/2009	K40	260	Bq kg-1 fw

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

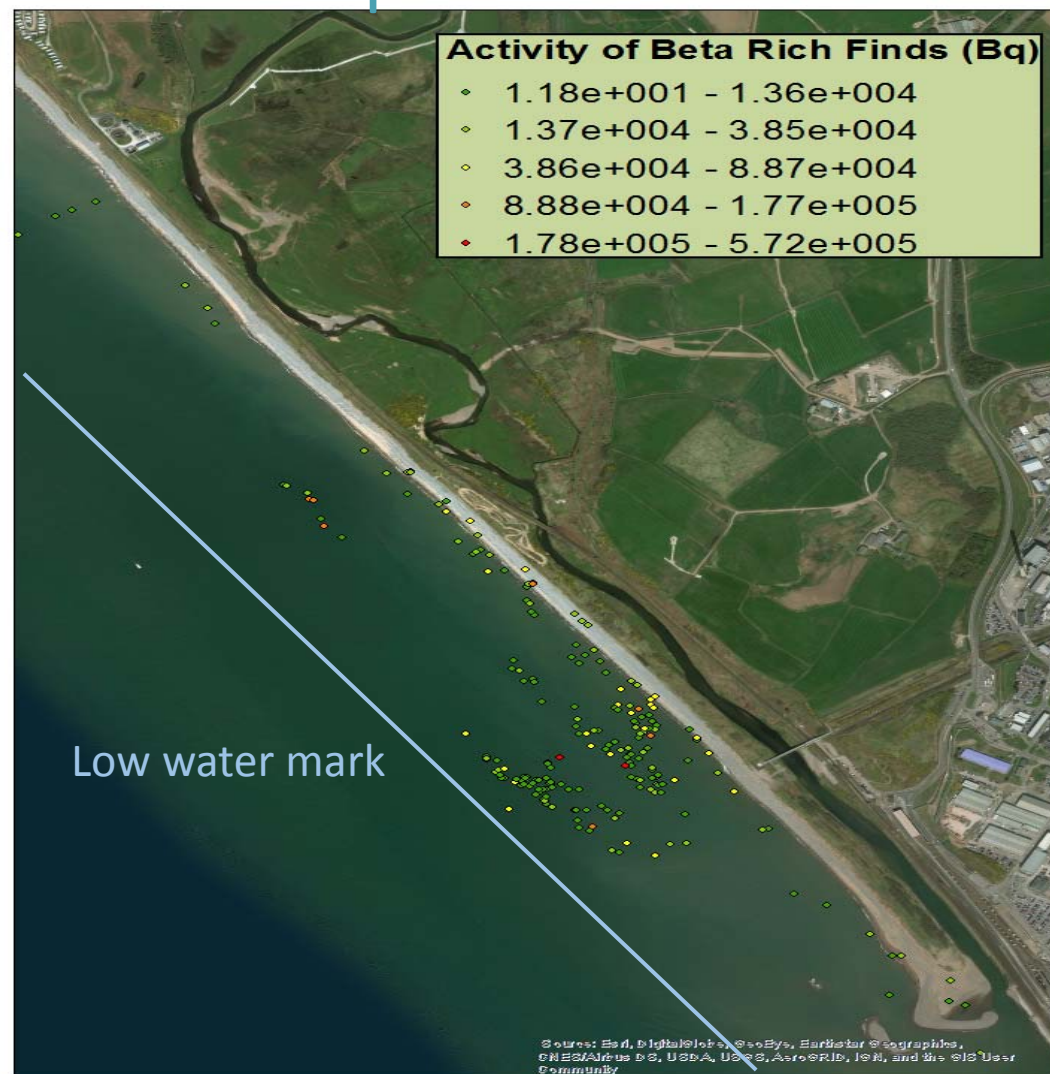
and sampleddate < CAST('1.1.2008' AS DATE)

and sampleddate > CAST('31.12.2006' AS DATE)

order by sampleddate;

Intended uses for TLD

Example 1 – distribution of particles



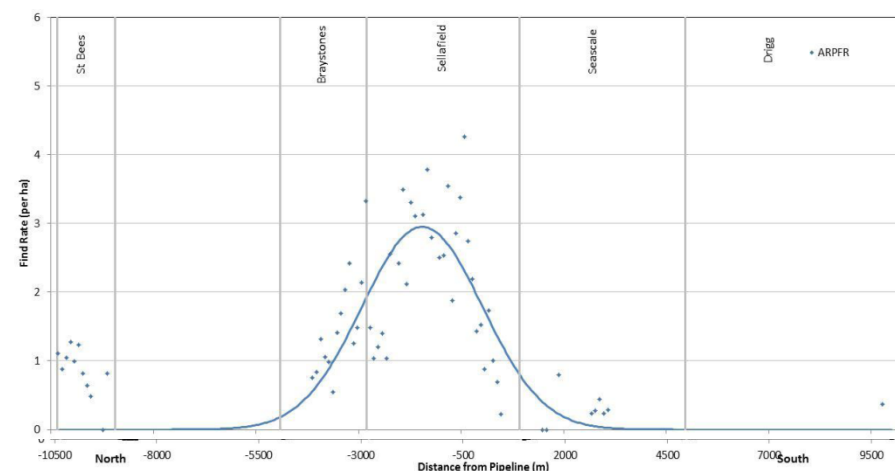
Intended uses for TLD

Example 1 – distribution of particles

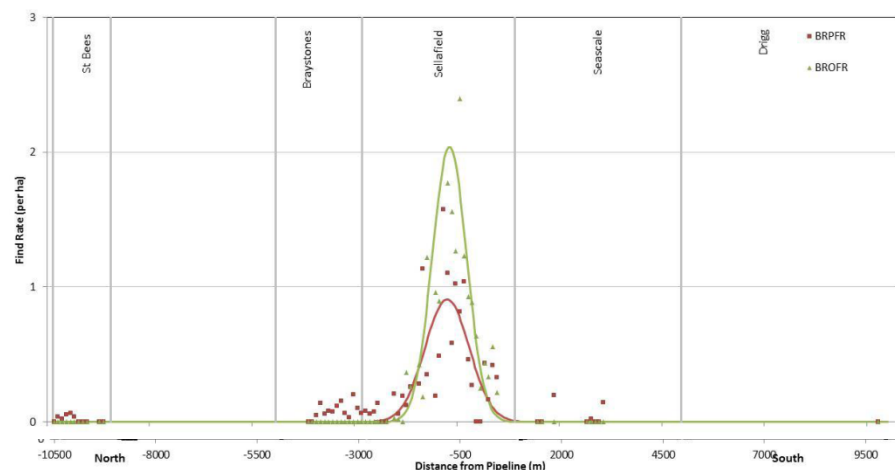
- Possible models MOPER, ARCTICMAR-19 (NRPA box model)
 - These models will include functionality to model dispersing particles in the marine environment and the intertidal region
 - Although the source term of the particles (ie actual quantities of particles released and the timing of these releases) 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



Intended uses for TLD

Example 2 – forest model

- Select data from Fukushima broadleaf forest dataset

*select sampleddate, result, rainfallrate from plant,
metdata*

where plant.survey_id = 1

and metdata.survey_id = 1

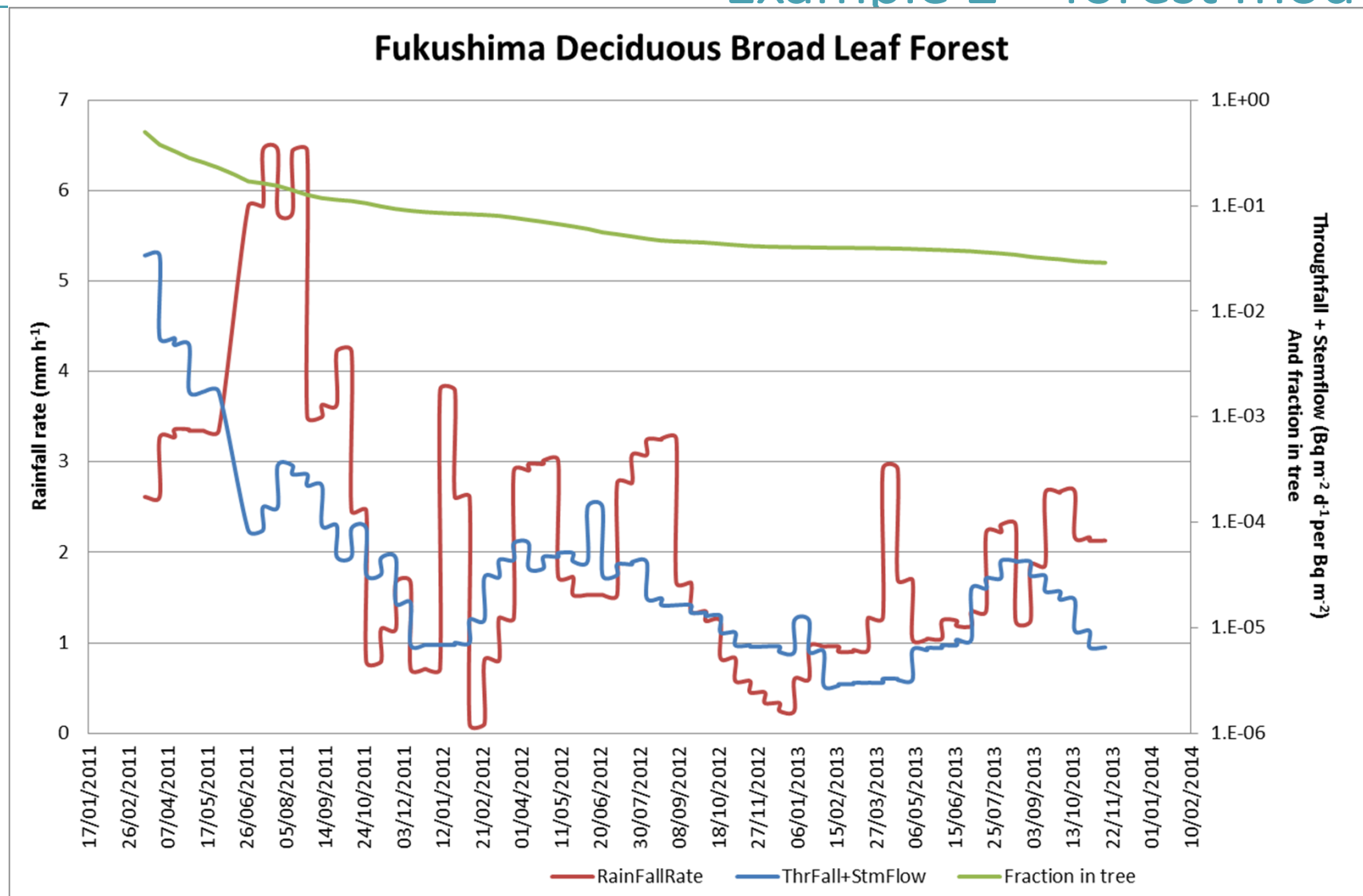
and samplename = 'Throughfall'

and result > '-1' and rainfallrate > '-1'

and plant.sampledate = metdata.metdate;

Intended uses for TLD

Example 2 – forest model



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 km² 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)

Any questions?