Contents

Chapter 1

TOAR II Database

Models

Contact

Name	Type	Description	Required
person	Person		Yes
organisation	Organisation		Yes

Coordinates

Name	Type	Description	Required
lat	number	longitude coordinate of station (decimal degrees_east). This is our best estimate of the station location which is not always identical to the official station coordinates (see coordinate_validation_status).	No
lng	number	latitude coordinate of station (decimal degrees_north). This is our best estimate of the station location which is not always identical to the official station coordinates (see coordinate_validation_status).	No

Name	Type	Description	Required
alt	number	altitude of station (in m above sea level). This is our best estimate of the station altitude, which is not always identical to the reported station altitude, but frequently uses the elevation from google earth instead (see coordinate_validation_status).	No

Data

Name	Type	Description	Required
datetime	dateTime	date and time of observation	Yes
value	number	variable value at datetime	Yes
flags	string	flags	Yes
timeseries_id	integer	ID of timeseries	Yes

Organisation

Name	Type	Description	Required
id	integer		Yes
name	string	Short name (abbreviation) of organisation	Yes
longname	string	Long name of organisation	Yes
kind	string	Kind of organisation	Yes
city	string	City where organisation resides	Yes
postcode	string	Postcode of organisation city	Yes
street_address	string	Street address of organisation city	Yes
country	string	Country to which organisation belongs	Yes
homepage	string	Homepage of organisation	Yes

Person

Name	Type	Description	Required
id	integer		Yes
name	string	Name of person	Yes
email	string	Email address of person	Yes
phone	string	Phone number of person	Yes
isprivate	boolean	Set this flag to true if the contact details shall not be exposed publicly	Yes

Stationmeta

Name	Type	Description	Required
id	integer		Yes
codes	[string]	list of station's codes	Yes
name	string		Yes
coordinates	Coordinates		Yes
country	string		Yes
state	string		Yes
coordinate_validation_status	string		Yes
coordinate_validation_date	dateTime		Yes
type_of_environment	string		Yes
type_of_area	string		Yes
timezone	string		Yes
additional_metadata	string (json-string)		No
coordinate_validator_id	integer		Yes
roles	[StationmetaRole]		No
annotations	[StationmetaAnnotation]		No
aux_images	[StationmetaAuxImage]		No
aux_docs	[StationmetaAuxDoc]		No
aux_urls	[StationmetaAuxUrl]		No
globalmeta	StationmetaGlobal		No

StationmetaAnnotation

Name	Type	Description	Required
id	integer		Yes
kind	integer		Yes
text	string		Yes
date_added	dateTime		Yes
approved	boolean		Yes
contributor_id	integer		Yes

StationmetaAuxDoc

Name	Type	Description	Required
id	integer		Yes
resource_description	string		Yes
date_added	dateTime		Yes
resource	string		Yes
station_id	integer		Yes

StationmetaAuxImage

Name	Type	Description	Required
id	integer		Yes
resource_description	string		Yes
date_added	dateTime		Yes
resource	string		Yes
image_height	integer		Yes
image_width	integer		Yes
station_id	integer		Yes

StationmetaAuxUrl

Name	Type	Description	Required
id	integer		Yes
resource_description	string		Yes
date_added	dateTime		Yes
resource	string		Yes
station_id	integer		Yes

StationmetaCore

Name	Type	Description	Required
id	integer		Yes
codes	[string]	list of station's codes	Yes
name	string		Yes
coordinates	Coordinates		Yes
country	string		Yes
state	string		Yes
coordinate_validation_status	string		Yes
coordinate_validation_date	dateTime		Yes
type_of_environment	string		Yes
type_of_area	string		Yes
timezone	string		Yes
additional_metadata	string (json-string)		No
coordinate_validator_id	integer		Yes

StationmetaGlobal

Name	Type	Description	Required
id	integer		Yes
population_density_year2010	number		Yes
max_population_density_25km_year2010	number		Yes
climatic_zone	string		Yes
nightlight_1km_year2013	number		Yes
nightlight_5km_year2013	number		Yes
max_nightlight_25km_year2013	number		Yes
wheat_production_year2000	number		Yes
rice_production_year2000	number		Yes
edgar_htap_v2_nox_emissions_year2010	number		Yes
omi_no2_column_years2011to2015	number		Yes
htap_region_tier1	string		Yes
etopo_alt	number		Yes
etopo_min_alt_5km	number		Yes
etopo_relative_alt	number		Yes
dominant_landcover_year2012	string		Yes
toar1_category	string		Yes
station_id	integer		Yes

StationmetaRole

Name	Type	Description	Required
id	integer		Yes
role	string		Yes

Name	Type	Description	Required
status	string		Yes
contact_id	integer		Yes

Timeseries

Name	Type	Description	Required
id	integer		Yes
label	string	a short string to distinguish this timeseries from others with the same combination of station and variable	Yes
order	integer	indicates position of this timeseries in a list when several timeseries share the same station and variable combination	Yes
access_rights	string	Access rights of timeseries data	Yes
sampling_frequency	string	Sampling frequency of data in this timeseries	Yes
aggregation	string	Aggregation type in this timeseries	Yes
source	string		Yes
data_start_date	dateTime	Start date of the variable data available for this station	Yes
data_end_date	dateTime	End date of the variable data available for this station	Yes
measurement_method	string	instrument principle of measurement	Yes
sampling_height	number	Height above the ground of the inlet/instrument/sampler (in m)	Yes
date_added	dateTime	Date of timeseries metadata entry into TOAR database	Yes
date_modified	dateTime	Date of last timeseries metadata modification	Yes
additional_metadata	string (json-string)	Additional information about the timeseries as JSON structure.	Yes

Name	Type	Description	Required
roles	[Time- series- Role]		No
annotations	[Time- seriesAn- nota- tion]		No
variable	Variable		Yes
station			No
programme	TimeseriesProgramme		Yes

TimeseriesAnnotation

Name	Type	Description	Required
id	integer		Yes
kind	integer		Yes
text	string		Yes
date_added	dateTime		Yes
approved	boolean		Yes
contributor_id	integer		Yes
timeseries_id	integer		Yes

TimeseriesProgramme

Name	Type	Description	Required
id	integer		Yes
name	string		Yes
longname	string		Yes
homepage	string		Yes
description	string		Yes

TimeseriesRole

Name	Type	Description	Required
id	integer		Yes
role	string		Yes
status	string		Yes
contact_id	integer		Yes

Variable

Name	Type	Description	Required
name	string	Name. Short variable-like name of the variable	Yes
longname	string	Longname. Long (explicit) name of the variable	Yes

Name	Type	Description	Required
displayname	string	Displayname. Display name of the variable	Yes
cf_standardname	string	Cf standardname. CF standard name of the variable if defined	Yes
units	string	Units. Physical units of variable	Yes
chemical_formula	string	Chemical formula. Chemical formula of variable(if applicable)	Yes
id	integer		Yes

controlled vocabulary

Rc_Vocabulary

- RC_vocabulary: [
  [0, 'PointOfContact', 'point of contact'],
  [1, 'PrincipalInvestigator', 'principal investigator'],
  [2, 'Originator', 'originator'],
  [3, 'Contributor', 'contributor'],
  [4, 'Collaborator', 'collaborator'],
  [5, 'ResourceProvider', 'resource provider']] #### Rs_Vocabulary ####
- RS_vocabulary: [
  [0, 'active', 'active'],
  [1, 'inactive', 'inactive'],
  [2, 'unknown', 'unknown']] #### Ok_Vocabulary ####
- OK_vocabulary: [
  [1, 'Government', 'government'],
  [2, 'Research', 'research'],
  [3, 'International', 'international'],
  [4, 'NonProfit', 'non-profit'],
  [5, 'Commercial', 'commercial'],
  [6, 'Individual', 'individual'],
  [7, 'Other', 'other']] #### Da_Vocabulary ####
- DA_vocabulary: [
  [0, 'ByAttribution', 'by attribution'],
  [1, 'ShareAlike', 'share alike'],
  [2, 'Restricted', 'restricted']] #### Sf_Vocabulary ####
- SF_vocabulary: [
  [0, 'Hourly', 'hourly'],
  [1, 'ThreeHourly', '3-hourly'],
  [2, 'SixHourly', '6-hourly'],
  [3, 'Daily', 'daily'],
  [4, 'Weekly', 'weekly'],
  [5, 'Monthly', 'monthly'],
  [6, 'Yearly', 'yearly'],
  [7, 'Irregular', 'irregular data samples of constant length'],
  [8, 'Irregular2', 'irregular data samples of varying length']] #### At_Vocabulary ####
- AT_vocabulary: [
  [0, 'Mean', 'mean'],
  [1, 'Mean1Of2', 'mean of two values'],
  [2, 'Mean1OfWeek', 'weekly mean'],
  [3, 'Mean4Samples', 'mean out of 4 samples'],

[4, 'MeanMonth', 'monthly mean'],
[5, 'None', 'none'],
[6, 'Unknown', 'unknown']] #### Ds_Vocabulary ####
- DS_vocabulary: [
[0, 'Model', 'model'],
[1, 'Measurement', 'measurement']] #### Mm_Vocabulary ####
- MM_vocabulary: [
[0, 'UVAbsorption', 'UV absorption'],
[1, 'UnknownInstrument', 'unknown instrument']] #### Cz_Vocabulary ####
- CZ_vocabulary: [
[-1, 'Undefined', 'undefined'],
[0, 'Unclassified', 'unclassified'],
[1, 'WarmTemperateMoist', 'warm temperate moist'],
[2, 'WarmTemperateDry', 'warm temperate dry'],
[3, 'CoolTemperateMoist', 'cool temperate moist'],
[4, 'CoolTemperateDry', 'cool temperate dry'],
[5, 'PolarMoist', 'polar moist'],
[6, 'PolarDry', 'polar dry'],
[7, 'BorealMoist', 'boreal moist'],
[8, 'BorealDry', 'boreal dry'],
[9, 'TropicalMontane', 'tropical montane'],
[10, 'TropicalWet', 'tropical wet'],
[11, 'TropicalMoist', 'tropical moist'],
[12, 'TropicalDry', 'tropical dry']] #### Cv_Vocabulary ####
- CV_vocabulary: [
[0, 'NotChecked', 'not checked'],
[1, 'Verified', 'verified'],
[2, 'Plausible', 'plausible'],
[3, 'Doubtful', 'doubtful'],
[4, 'Unverifyable', 'not verifyable']] #### St_Vocabulary ####
- ST_vocabulary: [
[0, 'Unknown', 'unknown'],
[1, 'Background', 'background'],
[2, 'Traffic', 'traffic'],
[3, 'Industrial', 'industrial'],
[4, 'Other', 'other']] #### Ta_Vocabulary ####
- TA_vocabulary: [
[0, 'Unknown', 'unknown'],
[1, 'Urban', 'urban'],
[2, 'Suburban', 'suburban'],
[3, 'Rural', 'rural'],
[4, 'Remote', 'remote']] #### Tc_Vocabulary ####
- TC_vocabulary: [
[-1, 'Unknown', 'unknown'],
[0, 'Unclassified', 'unclassified'],
[1, 'RuralLowElevation', 'rural low elevation'],
[2, 'RuralHighElevation', 'rural high elevation'],
[3, 'Urban', 'urban']] #### Tr_Vocabulary ####
- TR_vocabulary: [
[-1, 'HTAPTier1Undefined', '-1 (undefined)'],
[1, 'HTAPTier1World', '1 (World)'],
[2, 'HTAPTier1OCN', '2 (OCN Non-arctic/Antarctic Ocean)'],
[3, 'HTAPTier1NAM', '3 (NAM US+Canada (upto 66 N; polar circle))'],
[4, 'HTAPTier1EUR', '4 (EUR Western + Eastern EU+Turkey (upto 66 N polar circle))'],
[5, 'HTAPTier1SAS', '5 (SAS South Asia: India, Nepal, Pakistan, Afghanistan, Bangadesh, Sri Lanka)'],
[6, 'HTAPTier1EAS', '6 (EAS East Asia: China, Korea, Japan)'],
[7, 'HTAPTier1SEA', '7 (SEA South East Asia)'],
[8, 'HTAPTier1PAN', '8 (PAN Pacific, Australia+ New Zealand)'],
[9, 'HTAPTier1NAF', '9 (NAF Northern Africa+Sahara+Sahel)'],
[10, 'HTAPTier1SAF', '10 (SAF Sub Saharan/sub Sahel Africa)'],

[11, 'HTAPTier1MDE', '11 (MDE Middle East: S. Arabia, Oman, etc, Iran, Iraq)'],
[12, 'HTAPTier1MCA', '12 (MCA Mexico, Central America, Caribbean, Guyanas, Venezuela, Columbia)'],
[13, 'HTAPTier1SAM', '13 (SAM S. America)'],
[14, 'HTAPTier1RBU', '14 (RBU Russia, Belarussia, Ukraine)'],
[15, 'HTAPTier1CAS', '15 (CAS Central Asia)'],
[16, 'HTAPTier1NPO', '16 (NPO Arctic Circle (North of 66 N) + Greenland)'],
[17, 'HTAPTier1SPO', '17 (SPO Antarctic)']] #### Dl_Vocabulary ####

- DL_vocabulary: [
[-1, 'Undefined', '-1 (undefined)'],
[0, 'Water', '0 (Water)'],
[1, 'EGNeedleleaf', '1 (Evergreen Needleleaf forest)'],
[2, 'EGBroadleaf', '2 (Evergreen Broadleaf forest)'],
[3, 'DCNeedleleaf', '3 (Deciduous Needleleaf forest)'],
[4, 'DCBroadleaf', '4 (Deciduous Broadleaf forest)'],
[5, 'MixedForest', '5 (Mixed forest)'],
[6, 'ClosedShrublands', '6 (Closed shrublands)'],
[7, 'OpenShrublands', '7 (Open shrublands)'],
[8, 'WoodySavannas', '8 (Woody savannas)'],
[9, 'Savannas', '9 (Savannas)'],
[10, 'Grasslands', '10 (Grasslands)'],
[11, 'Wetlands', '11 (Permanent wetlands)'],
[12, 'Croplands', '12 (Croplands)'],
[13, 'Urban', '13 (Urban and built-up)'],
[14, 'Mosaic', '14 (Cropland/Natural vegetation mosaic)'],
[15, 'Snow', '15 (Snow and ice)'],
[16, 'Barren', '16 (Barren or sparsely vegetated)'],
[255, 'Fill', '255 (Fill Value/Unclassified)']] #### Rt_Vocabulary ####

- RT_vocabulary: [
[0, 'String', 'str'],
[1, 'Integer', 'int'],
[2, 'Float', 'float']] #### Df_Vocabulary ####

- DF_vocabulary: [
[0, 'OK', 'OK'],
[1, 'OKPreliminary', 'OK preliminary'],
[2, 'OKModified', 'OK modified'],
[3, 'OKPreliminaryModified', 'OK preliminary modified'],
[4, 'Inconsistent', 'inconsistent'],
[5, 'InconsistentPreliminary', 'inconsistent preliminary'],
[6, 'Doubtful', 'doubtful'],
[7, 'DoubtfulPreliminary', 'doubtful preliminary'],
[8, 'DoubtfulModified', 'doubtful modified'],
[9, 'DoubtfulPreliminaryModified', 'doubtful preliminary modified'],
[10, 'Wrong', 'wrong'],
[11, 'WrongPreliminary', 'wrong preliminary'],
[12, 'NotCheckedPreliminary', 'not checked preliminary'],
[13, 'Changed', 'changed'],
[14, 'Estimated', 'estimated'],
[15, 'MissingValue', 'missing value']]

REST API

/controlled_vocabulary

GET

Summary:

Info

Responses

Code	Description
200	Successful Response

/variables/

GET

Summary:

Get Variables

Parameters

Name	Located in	Description	Required	Schema
skip	query		No	integer
limit	query		No	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/variables/{name}

GET

Summary:

Get Variable

Parameters

Name	Located in	Description	Required	Schema
name	path		Yes	string

Responses

Code	Description
200	Successful Response
422	Validation Error

/variables/id/{variable_id}

GET

Summary:

Get Variable

Parameters

Name	Located in	Description	Required	Schema
variable_id	path		Yes	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/contacts/persons/

GET

Summary:

Get All Persons

Parameters

Name	Located in	Description	Required	Schema
skip	query		No	integer
limit	query		No	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/contacts/persons/id/{person_id}

GET

Summary:

Get Person

Parameters

Name	Located in	Description	Required	Schema
person_id	path		Yes	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/contacts/persons/{name}

GET

Summary:

Get Person

Parameters

Name	Located in	Description	Required	Schema
name	path		Yes	string

Responses

Code	Description
200	Successful Response
422	Validation Error

/contacts/organisations/

GET

Summary:

Get All Organisations

Parameters

Name	Located in	Description	Required	Schema
skip	query		No	integer
limit	query		No	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/contacts/organisations/id/{organisation_id}

GET

Summary:

Get Organisation

Parameters

Name	Located in	Description	Required	Schema
organisation_id	path		Yes	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/contacts/organisations/{name}

GET

Summary:

Get Organisation

Parameters

Name	Located in	Description	Required	Schema
name	path		Yes	string

Responses

Code	Description
200	Successful Response
422	Validation Error

/contacts/

GET

Summary:

Get All Contacts

Parameters

Name	Located in	Description	Required	Schema
skip	query		No	integer
limit	query		No	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/stationmeta_core/

GET

Summary:

Get All Stationmeta Core

Parameters

Name	Located in	Description	Required	Schema
skip	query		No	integer
limit	query		No	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/stationmeta/

GET

Summary:

Get All Stationmeta

Parameters

Name	Located in	Description	Required	Schema
skip	query		No	integer
limit	query		No	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/stationmeta_core/{station_code}

GET

Summary:

Get Stationmeta Core

Parameters

Name	Located in	Description	Required	Schema
station_code	path		Yes	string

Responses

Code	Description
200	Successful Response
422	Validation Error

/stationmeta/{station_code}

GET

Summary:

Get Stationmeta

Parameters

Name	Located in	Description	Required	Schema
station_code	path		Yes	string

Responses

Code	Description
200	Successful Response
422	Validation Error

/timeseries/

GET

Summary:

Get All Timeseries

Parameters

Name	Located in	Description	Required	Schema
skip	query		No	integer
limit	query		No	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/timeseries/{timeseries_id}

GET

Summary:

Get Timeseries

Parameters

Name	Located in	Description	Required	Schema
timeseries_id	path		Yes	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/data/

GET

Summary:

Get All Data

Parameters

Name	Located in	Description	Required	Schema
skip	query		No	integer
limit	query		No	integer

Responses

Code	Description
200	Successful Response
422	Validation Error

/data/{timeseries_id}

GET

Summary:

Get Data

Parameters

Name	Located in	Description	Required	Schema
timeseries_id	path		Yes	integer

Responses

Code	Description
200	Successful Response
422	Validation Error