

## EPSG v10 data model changes

### 1. Changes to relational tables<sup>1</sup>

For [details listed by table](#), see [here](#). In summary:

a) The `epsg_area` table is removed and replaced by an `epsg_extent` table. The first seven fields will be renamed, with some reordering. The `area_polygon_file_ref` field is removed. Five new fields will be added. For all fields in the area table other than `area_polygon_file_ref` there is a 1:1 mapping from the area table to a field in the extent table. A new `epsg_areapolygon` table will be included in the repository but not in the Access database export.

b) In addition to the extent table, seven new tables are added:

<code>epsg_conventionalRS</code>	<code>epsg_heightTransformation</code>
<code>epsg_datumEnsemble</code>	<code>epsg_scope</code>
<code>epsg_datumEnsembleMember</code>	<code>epsg_usage</code>
<code>epsg_datumRealizationMethod</code>	

c) In the `epsg_coordinateReferencesystem`, `epsg_datum` and `epsg_coordinateoperation` tables, the `area_of_use_code` and `scope` fields will be deprecated. They will be changed from mandatory to optional and left unpopulated. These fields will be replaced by the new `epsg_usage` intersection table.

d) In the `epsg_coordinateAxis` table, the `uom_code` field is changed from mandatory to optional.

e) There is a change to one field name in the `epsg_coordinateReferenceSystem` table.

f) Additional fields are added at the end of the `epsg_datum` table.

g) There are changes to some field lengths in the following tables:

<code>epsg_coordinateAxisName</code>	<code>epsg_datum</code>
<code>epsg_coordinateSystem</code>	<code>epsg_ellipsoid</code>
<code>epsg_coordinateOperation</code>	<code>epsg_namingsystem</code>
<code>epsg_coordinateOperationMethod</code>	<code>epsg_primeMeridian</code>
<code>epsg_coordinateOperationParameter</code>	<code>epsg_unitOfMeasure</code>

h) There are no changes to the following tables:

<code>epsg_alias</code>	<code>epsg_coordinateOperationPath</code>
<code>epsg_change</code>	<code>epsg_deprecation</code>
<code>epsg_coordinateOperationParamUsage</code>	<code>epsg_supersession</code>
<code>epsg_coordinateOperationParamValue</code>	<code>epsg_versionHistory</code>

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<sup>1</sup> In this document Camel case is used to facilitate reading of table names. In implementation, in the SQL relational tables no upper case characters are used.

## 2. Changes to GML schema

ISO 19136 (GML v3.2.1) is not being updated to track the data model changes in ISO 19111. IOGP has therefore decided to retain unchanged as much of these schemas as possible, adding the new model through extensions and additional EPSG structures in an EPSG namespace. The following is highlighted:

- Where elements need to be added to gml structures, data has been added as metadata declarations similar to how gml was extended with IOGP specific information in the previous model. See `epsg:CommonMetaData` or `epsg:CRSMetaData`. This applies to the `conventionalRSName` and `realizationMethod` for datums, and to `geoidModel` and `velocityModel` for CRSs.
- New classes are supported by extension and substitution groups:
  - The introduction of dynamic geodetic and dynamic vertical datums is made such that `epsg:dynamicGeodeticDatum` is extending `gml:geodeticDatum` with frame reference epoch and `epsg:dynamicVerticalDatum` is extending `gml:verticalDatum` with frame reference epoch. `geodeticDatumEnsemble` and `verticalDatumEnsemble` are added using substitution groups `gml:GeodeticDatum` and `gml:VerticalDatum` and extending `gml:GeodeticDatumType` and `gml:VerticalDatumType` with the element `ensembleAccuracy`. This is done to allow the use of datum ensembles in place of datums in CRS classes.
  - A new `OrdinalCS` class is added using substitution group `gml:AbstractCoordinateSystem` and derived from `gml:AbstractCoordinateSystemType` and for this the `coordinateAxisUom` is must be value of “1” to indicate it is unitless.
  - A new `PointMotion` class is added using substitution group `gml:Transformation` and derived from `gml:TransformationType`, no elements are added but it is required that `targetCRS` is either blank or exactly the same as `sourceCRS`.
- The attribute of `publicationDate` for datums is handled by simply using the current `realizationEpoch` element for the `publicationDate` data.
- The combination of `scope` and `extent` into a new complex element `Usage` is handled by creating `Usage` as having two elements, `gml:domainOfValidity` and `gml:scope`. `Usage` is then added to the previously defined `epsg:CommonMetaData` structure. Any number of `Usage` elements can be present.

The updated [epsg.xsd file](#) may be obtained from [here](#).