```sql
----------------------------------------------------------------------
----Le script ci joint traite les données placées dans un schéma nommé ocs_ge
-----pour le département 77
----les tables ocs_ge_2021_077 et ocs_ge_2017_077 représentent respectivement
-----l'OCS GE du département 77 en 2021 et en 2017 dans le système Lambert93
----------------------------------------------------------------------


----------------------------------------------------------------------------
-----------------------PREPARATION DES DONNEES-----------------------
----------------------------------------------------------------------------

-----nettoyage de la géométrie-------------------------
update ocs_ge.ocs_ge_2021_077 set
geom=st_multi(st_simplify(ST_Multi(ST_CollectionExtract(ST_ForceCollection(
ST_MakeValid(geom)),3)),0)) WHERE st_geometrytype(geom) in ('ST_Polygon',
'ST_MultiPolygon') and st_isvalid(geom) is false;

update ocs_ge.ocs_ge_2017_077 set
geom=st_multi(st_simplify(ST_Multi(ST_CollectionExtract(ST_ForceCollection(
ST_MakeValid(geom)),3)),0)) WHERE st_geometrytype(geom) in ('ST_Polygon',
'ST_MultiPolygon') and st_isvalid(geom) is false;

update ocs_ge.zone_construite_2017_077 set
geom=st_multi(st_simplify(ST_Multi(ST_CollectionExtract(ST_ForceCollection(
ST_MakeValid(geom)),3)),0)) WHERE st_geometrytype(geom) in ('ST_Polygon',
'ST_MultiPolygon') and st_isvalid(geom) is false;

update ocs_ge.zone_construite_2021_077 set
geom=st_multi(st_simplify(ST_Multi(ST_CollectionExtract(ST_ForceCollection(
ST_MakeValid(geom)),3)),0)) WHERE st_geometrytype(geom) in ('ST_Polygon',
'ST_MultiPolygon') and st_isvalid(geom) is false;


---ajout d'un champ surface-------
alter table ocs_ge.ocs_ge_2021_077 add column surface double precision;
alter table ocs_ge.ocs_ge_2017_077 add column surface double precision;

update ocs_ge.ocs_ge_2021_077 set surface=st_area(geom);
update ocs_ge.ocs_ge_2017_077 set surface=st_area(geom);



----------------------------------------------------------------------------
--------------Affectation d'une catégorie----------------------------
----------------------------------------------------------------------------



----ajout colonne artif/non artif dans ocs ge 2021
alter table ocs_ge.ocs_ge_2021_077 add column artif character varying(10);

---artificialisé en raison du bâti
update ocs_ge.ocs_ge_2021_077 set artif='artif' where code_cs='CS1.1.1.1';

---artificialisé autre
update ocs_ge.ocs_ge_2021_077
set artif='artif'
where
artif is null and
(
(code_cs='CS1.1.1.2' or code_cs='CS1.1.2.2') or (code_cs = 'CS1.1.2.1' AND NOT code_us
 = 'US1.3')
or
((code_cs like 'CS2.2%') AND (code_us = 'US2'OR code_us = 'US3'  OR code_us = 'US5'
OR code_us = 'US235' OR code_us like 'US4%' OR code_us = 'US6.1'  OR code_us = 'US6.2'
)));

--non artificialisé
update ocs_ge.ocs_ge_2021_077 set artif='non artif' where artif is null;

----ajout attributs artif/non artif dans ocs ge 2017
alter table ocs_ge.ocs_ge_2017_077 add column artif character varying(10);
```

```sql
63    ---artificialisé en raison du bâti
64    update ocs_ge.ocs_ge_2017_077 set artif='artif' where code_cs='CS1.1.1.1';
65
66    ---artificialisé autre
67    update ocs_ge.ocs_ge_2017_077
68    set artif='artif'
69    where
70    artif is null and
71    (
72    (code_cs='CS1.1.1.2' or code_cs='CS1.1.2.2') or (code_cs = 'CS1.1.2.1' AND NOT code_us
       = 'US1.3')
73    or
74    ((code_cs like 'CS2.2%') AND (code_us = 'US2'OR code_us = 'US3'  OR code_us = 'US5'
       OR code_us = 'US235' OR code_us like 'US4%' OR code_us = 'US6.1'  OR code_us = 'US6.2'
       )));
75
76    --non artificialisé
77    update ocs_ge.ocs_ge_2017_077 set artif='non artif' where artif is null;
78
79    ---------------------------------------------------------------------------
80    ---------------Fusion des polygones voisins--------------------------
81    ---------------------------------------------------------------------------
82
83
84    ----union des objets artif bat, artif et non artif 2017------------
85
86    drop table if exists ocs_ge.t1;
87    create table ocs_ge.t1 as
88    SELECT row_number() over() as gid,artif
89    st_unaryunion(unnest(st_clusterintersecting(geom))) as geom
90    FROM ocs_ge.ocs_ge_2021_077 group by artif;
91
92    CREATE INDEX ON ocs_ge.t1 USING gist (geom);
93
94    drop table if exists ocs_ge.t2;
95    create table ocs_ge.t2 as
96    SELECT row_number() over() as gid,artif,
97    st_unaryunion(unnest(st_clusterintersecting(geom))) as geom
98    FROM ocs_ge.ocs_ge_2017_077 group by artif;
99
100   CREATE INDEX ON ocs_ge.t2 USING gist (geom);
101
102
103   ---nettoyage des multicollections et calcul des surfaces-----------
104   drop table if exists ocs_ge.temp_zan_2021_077;
105   create table ocs_ge.temp_zan_2021_077 as
106   select artif,st_multi((ST_Dump(geom)).geom)::geometry(MultiPolygon,2154) as geom from
       ocs_ge.t1
107   where st_geometrytype(geom) in ('ST_Polygon','ST_MultiPolygon')
108   union
109   select artif,st_multi((ST_Dump(ST_CollectionExtract(geom,3))).geom)::geometry(
       MultiPolygon,2154) as geom  from ocs_ge.t1
110   where st_geometrytype(geom) in ('ST_GeometryCollection');
111
112   CREATE INDEX ON ocs_ge.temp_zan_2021_077 USING gist (geom);
113
114   alter table ocs_ge.temp_zan_2021_077 add column surf_m2 double precision;
115   update ocs_ge.temp_zan_2021_077 set surf_m2=st_area(geom);
116
117   alter table ocs_ge.temp_zan_2021_077 add column gid serial not null;
118
119   drop table if exists ocs_ge.temp_zan_2017_077;
120   create table ocs_ge.temp_zan_2017_077 as
121   select artif,st_multi((ST_Dump(geom)).geom)::geometry(MultiPolygon,2154) as geom from
       ocs_ge.t2
122   where st_geometrytype(geom) in ('ST_Polygon','ST_MultiPolygon')
123   union
124   select artif,st_multi((ST_Dump(ST_CollectionExtract(geom,3))).geom)::geometry(
       MultiPolygon,2154) as geom  from ocs_ge.t2
125   where st_geometrytype(geom) in ('ST_GeometryCollection');
126
127   CREATE INDEX ON ocs_ge.temp_zan_2017_077 USING gist (geom);
128
```

```sql
129    alter table ocs_ge.temp_zan_2017_077 add column surf_m2 double precision;
130    update ocs_ge.temp_zan_2017_077 set surf_m2=st_area(geom);
131
132    alter table ocs_ge.temp_zan_2017_077 add column gid serial not null;
133
134    ---identifier les objets classés artif qui sont dûs au bati pour ne pas y toucher--
135
136    ---en 2017-----
137    alter table ocs_ge.temp_zan_2017_077 add column isbati character varying(3);
138
139    create temp table t3 as
140    select code_cs,st_pointonsurface(geom) as geom from ocs_ge.ocs_ge_2017_077 where
       code_cs='CS1.1.1.1';
141    CREATE INDEX ON t3 USING gist (geom);
142
143    update ocs_ge.temp_zan_2017_077 a
144    set isbati='oui'
145    from t3 where st_within(t3.geom,a.geom) and artif='artif';
146
147
148    --- en 2021
149    alter table ocs_ge.temp_zan_2021_077 add column isbati character varying(3);
150
151    create temp table t4 as
152    select code_cs,st_pointonsurface(geom) as geom from ocs_ge.ocs_ge_2021_077 where
       code_cs='CS1.1.1.1';
153    CREATE INDEX ON t4 USING gist (geom);
154
155    update ocs_ge.temp_zan_2021_077 a
156    set isbati='oui' from t4 where st_within(t4.geom,a.geom) and artif='artif';
157
158
159    ---faire une copie de temp_zan en 2017
160    drop table if exists ocs_ge.temp2_zan_2017_077;
161    create table ocs_ge.temp2_zan_2017_077 as select * from ocs_ge.temp_zan_2017_077;
162    CREATE INDEX ON ocs_ge.temp2_zan_2017_077 USING gist (geom);
163
164    ---faire une copie de temp_zan en 2021
165    drop table if exists ocs_ge.temp2_zan_2021_077;
166    create table ocs_ge.temp2_zan_2021_077 as select * from ocs_ge.temp_zan_2021_077;
167    CREATE INDEX ON ocs_ge.temp2_zan_2021_077 USING gist (geom);
168
169    ------------------------------------------------------------------------
170    -----changement de classe des petits objets artifs non bati <2500m2
171    ------------------------------------------------------------------------
172
173    update  ocs_ge.temp2_zan_2017_077 set
174    artif='non artif' where artif='artif' and isbati is null and surf_m2<2500;
175
176    update  ocs_ge.temp2_zan_2021_077 set
177    artif='non artif' where artif='artif' and isbati is null and surf_m2<2500;
178
179    ------------------------------------------------------------------------
180    ---refaire l'union-----------------------------------------------------
181    ------------------------------------------------------------------------
182
183    drop table if exists ocs_ge.t1;
184    create table ocs_ge.t1 as
185    SELECT artif,
186    st_unaryunion(unnest(st_clusterintersecting(geom))) as geom
187    FROM ocs_ge.temp2_zan_2017_077 where artif='non artif' group by artif
188    union
189    select artif,geom from ocs_ge.temp2_zan_2017_077 where artif='artif';
190
191    CREATE INDEX ON ocs_ge.t1 USING gist (geom);
192
193    drop table if exists ocs_ge.t2;
194    create table ocs_ge.t2 as
195    SELECT artif,
196    st_unaryunion(unnest(st_clusterintersecting(geom))) as geom
197    FROM ocs_ge.temp2_zan_2021_077 where artif='non artif' group by artif
198    union
199    select artif,geom from ocs_ge.temp2_zan_2021_077 where artif='artif';
```

```sql
200
201    CREATE INDEX ON ocs_ge.t2 USING gist (geom);
202
203    -------------------------------------------------------
204    ---nettoyer les géométries collection
205    -------------------------------------------------------
206    drop table if exists ocs_ge.t11;
207    create table ocs_ge.t11 as
208    select artif,st_multi((ST_Dump(geom)).geom)::geometry(MultiPolygon,2154) as geom from
       ocs_ge.t1
209    where st_geometrytype(geom) in ('ST_Polygon','ST_MultiPolygon')
210    union
211    select artif,st_multi((ST_Dump(ST_CollectionExtract(geom,3))).geom)::geometry(
       MultiPolygon,2154) as geom  from ocs_ge.t1
212    where st_geometrytype(geom) in ('ST_GeometryCollection');
213
214    CREATE INDEX ON ocs_ge.t11 USING gist (geom);
215
216    alter table ocs_ge.t11 add column surf_m2 double precision;
217    update ocs_ge.t11 set surf_m2=st_area(geom);
218
219
220    drop table if exists ocs_ge.t22;
221    create table ocs_ge.t22 as
222    select artif,st_multi((ST_Dump(geom)).geom)::geometry(MultiPolygon,2154) as geom from
       ocs_ge.t2
223    where st_geometrytype(geom) in ('ST_Polygon','ST_MultiPolygon')
224    union
225    select artif,st_multi((ST_Dump(ST_CollectionExtract(geom,3))).geom)::geometry(
       MultiPolygon,2154) as geom  from ocs_ge.t2
226    where st_geometrytype(geom) in ('ST_GeometryCollection');
227
228    CREATE INDEX ON ocs_ge.t22 USING gist (geom);
229
230    alter table ocs_ge.t22 add column surf_m2 double precision;
231    update ocs_ge.t22 set surf_m2=st_area(geom);
232
233    -------------------------------------------------------
234    -----changement de classe des petits objets non artif <2500m2
235    -------------------------------------------------------
236    update  ocs_ge.t11 set
237    artif='artif' where artif='non artif' and surf_m2<2500;
238
239    update  ocs_ge.t22 set
240    artif='artif' where artif='non artif' and surf_m2<2500;
241
242    --------------------------------------------------------------
243    -----reassembler et nettoyer-------------
244    --------------------------------------------------------------
245    drop table if exists ocs_ge.t111; --9mn
246    create table ocs_ge.t111 as
247    SELECT artif,
248    st_unaryunion(unnest(st_clusterintersecting(geom))) as geom
249    FROM ocs_ge.t11 where artif='artif' group by artif
250    union
251    select artif,geom from  ocs_ge.t11 where artif='non artif';
252
253    CREATE INDEX ON ocs_ge.t111 USING gist (geom);
254
255    drop table if exists ocs_ge.t222;
256    create table ocs_ge.t222 as
257    SELECT artif,
258    st_unaryunion(unnest(st_clusterintersecting(geom))) as geom
259    FROM ocs_ge.t22 where artif='artif' group by artif
260    union
261    select artif,geom from  ocs_ge.t22 where artif='non artif';
262
263    CREATE INDEX ON ocs_ge.t222 USING gist (geom);
264
265    drop table if exists ocs_ge.zan_2017_077;
266    create table ocs_ge.zan_2017_077 as
267    select artif,st_multi((ST_Dump(geom)).geom)::geometry(MultiPolygon,2154) as geom from
       ocs_ge.t111
```

```sql
268    where st_geometrytype(geom) in ('ST_Polygon','ST_MultiPolygon')
269    union
270    select artif,st_multi((ST_Dump(ST_CollectionExtract(geom,3))).geom)::geometry(
       MultiPolygon,2154) as geom  from ocs_ge.t111
271    where st_geometrytype(geom) in ('ST_GeometryCollection');
272
273    CREATE INDEX ON ocs_ge.zan_2017_077 USING gist (geom);
274
275    alter table ocs_ge.zan_2017_077 add column surf_m2 double precision;
276    update ocs_ge.zan_2017_077 set surf_m2=st_area(geom);
277    alter table ocs_ge.zan_2017_077 add column gid serial not null;
278
279
280    drop table if exists ocs_ge.zan_2021_077;
281    create table ocs_ge.zan_2021_077 as
282    select artif,st_multi((ST_Dump(geom)).geom)::geometry(MultiPolygon,2154) as geom from
       ocs_ge.t222
283    where st_geometrytype(geom) in ('ST_Polygon','ST_MultiPolygon')
284    union
285    select artif,st_multi((ST_Dump(ST_CollectionExtract(geom,3))).geom)::geometry(
       MultiPolygon,2154) as geom  from ocs_ge.t222
286    where st_geometrytype(geom) in ('ST_GeometryCollection');
287
288    CREATE INDEX ON ocs_ge.zan_2021_077 USING gist (geom);
289
290    alter table ocs_ge.zan_2021_077 add column surf_m2 double precision;
291    update ocs_ge.zan_2021_077 set surf_m2=st_area(geom);
292    alter table ocs_ge.zan_2021_077 add column gid serial not null;
293
294    -------------------------------------------------------------------------
295    -----créer une table d'évolution 2017 à 2021
296    -------------------------------------------------------------------------
297
298    ---créer des objets plus petits car traitements longs
299    drop table if exists ocs_ge.zan2017_subdi;
300    create table ocs_ge.zan2017_subdi as
301    select artif as etat2017,st_subdivide(geom) as geom
302    from ocs_ge.zan_2017_077;
303
304    create index on ocs_ge.zan2017_subdi using gist (geom);
305
306    drop table if exists ocs_ge.zan2021_subdi;
307    create table ocs_ge.zan2021_subdi as
308    select artif as etat2021,st_subdivide(geom) as geom
309    from ocs_ge.zan_2021_077;
310
311    create index on ocs_ge.zan2021_subdi using gist (geom);
312
313
314    drop table if exists ocs_ge.inter1;
315    create table ocs_ge.inter1 as
316    select row_number() over() as gid,
317    a.etat2017,b.etat2021,
318    CASE
319        WHEN st_within(a.geom, b.geom) THEN st_multi(a.geom)
320        ELSE st_intersection(a.geom,b.geom)
321        END AS geom
322    from ocs_ge.zan2017_subdi a
323    join ocs_ge.zan2021_subdi b
324    on a.geom&&b.geom
325    where st_intersects (a.geom, b.geom);
326
327    create index on ocs_ge.inter1 using gist (geom);
328
329    drop table if exists ocs_ge.zan_evol_2017_2021_077;
330    create table ocs_ge.zan_evol_2017_2021_077 as
331    select etat2017,etat2021,st_multi(geom)::geometry(MultiPolygon,2154) as geom from
       ocs_ge.inter1
332    where st_geometrytype(geom) in ('ST_Polygon','ST_MultiPolygon')
333    union
334    select etat2017,etat2021,st_multi(ST_CollectionExtract(geom,3))::geometry(MultiPolygon
       ,2154) as geom  from ocs_ge.inter1
335    where st_geometrytype(geom) in ('ST_GeometryCollection');
```

```sql
CREATE INDEX ON ocs_ge.zan_evol_2017_2021_077 USING gist (geom);
alter table ocs_ge.zan_evol_2017_2021_077 add column gid serial not null;

alter table ocs_ge.zan_evol_2017_2021_077 add column surface double precision;

update ocs_ge.zan_evol_2017_2021_077 set surface =st_area(geom);

-------------------------------------------------------------------------
-----------statistiques communales
-------------------------------------------------------------------------

create temp table t as
select row_number() over() as gid,b.insee_com, b.nom,a.artif,
CASE
    WHEN st_within(a.geom, b.geom) THEN st_multi(a.geom)
    ELSE st_intersection(a.geom,b.geom)
    END AS geom
from ocs_ge.zan_2017_077 a
join ocs_ge.communes77 b
on a.geom&&b.geom
where st_intersects (a.geom, b.geom);

create index on t using gist (geom);

drop table if exists ocs_ge.zan_commune_2017_077;
create table ocs_ge.zan_commune_2017_077 as
select insee_com,nom,artif,st_multi(geom)::geometry(MultiPolygon,2154) as geom from t
where st_geometrytype(geom) in ('ST_Polygon','ST_MultiPolygon')
union
select insee_com,nom,artif,st_multi(ST_CollectionExtract(geom,3))::geometry(
MultiPolygon,2154) as geom  from t
where st_geometrytype(geom) in ('ST_GeometryCollection');

CREATE INDEX ON ocs_ge.zan_commune_2017_077 USING gist (geom);
update ocs_ge.zan_commune_2017_077 set
geom=st_multi(st_simplify(ST_Multi(ST_CollectionExtract(ST_ForceCollection(
ST_MakeValid(geom)),3)),0)) WHERE st_geometrytype(geom) in ('ST_Polygon',
'ST_MultiPolygon')
and st_isvalid(geom) is false;

alter table ocs_ge.zan_commune_2017_077 add column gid serial not null;

------
create temp table s as
select row_number() over() as gid,b.insee_com, b.nom,a.artif,
CASE
    WHEN st_within(a.geom, b.geom) THEN st_multi(a.geom)
    ELSE st_intersection(a.geom,b.geom)
    END AS geom
from ocs_ge.zan_2021_077 a
join ocs_ge.communes77 b
on a.geom&&b.geom
where st_intersects (a.geom, b.geom);

create index on s using gist (geom);

drop table if exists ocs_ge.zan_commune_2021_077;
create table ocs_ge.zan_commune_2021_077 as
select insee_com,nom,artif,st_multi(geom)::geometry(MultiPolygon,2154) as geom from s
where st_geometrytype(geom) in ('ST_Polygon','ST_MultiPolygon')
union
select insee_com,nom,artif,st_multi(ST_CollectionExtract(geom,3))::geometry(
MultiPolygon,2154) as geom  from s
where st_geometrytype(geom) in ('ST_GeometryCollection');

CREATE INDEX ON ocs_ge.zan_commune_2021_077 USING gist (geom);
update ocs_ge.zan_commune_2021_077 set
geom=st_multi(st_simplify(ST_Multi(ST_CollectionExtract(ST_ForceCollection(
ST_MakeValid(geom)),3)),0)) WHERE st_geometrytype(geom) in ('ST_Polygon',
'ST_MultiPolygon')
and st_isvalid(geom) is false;
```

```sql
alter table ocs_ge.zan_commune_2021_077 add column gid serial not null;

alter table ocs_ge.communes77 add column sartif17 double precision;
alter table ocs_ge.communes77 add column sartif21 double precision;
alter table ocs_ge.communes77 add column evol1721 double precision;

create temp table c as select insee_com,sum(st_area(geom))/10000 as surf from ocs_ge.zan_commune_2017_077  where artif='artif' group by insee_com;
create temp table d as select insee_com,sum(st_area(geom))/10000 as surf from ocs_ge.zan_commune_2021_077 where artif='artif' group by insee_com;

update ocs_ge.communes77 set sartif17=surf from c where communes77.insee_com=c.insee_com;
update ocs_ge.communes77 set sartif21=surf from d where communes77.insee_com=d.insee_com;
update ocs_ge.communes77 set evol1721=sartif21-sartif17;
```