Interpolations verticales via Xios:
mécanique d'union+zoom pour les jeux de pressions CMIP6 (plevs)

- Objectif : optimiser la demande d'interpolation Xios en niveaux pression (éviter de dupliquer le travail sur les intersections de jeux de pression)

- Principe : pour 1 grandeur physique donnée :
    1. identification de l'ensemble jeux de plevs sur lesquels elle est demandée
    2. union des jeux de plevs
    3. demande d'interpolation sur l'union
    4. extraction sur chaque jeu de plevs individuel en utilisant la fonctionnalité Xios de zoom

- Couvre également les niveaux singleton (ex. ta850)

- Fonctionne aussi avec les variables spécifiées dans les extra-Tables + possibilité de lire des jeux de niveaux de pression différents de ceux de CMIP6 dans une extra-Table de coordonnées ('<PROJET>_coordinate.json')

- Les alias superflus de type 'CMIP6_hus7h' disparaissent des pingfiles (les field-id de type 'CMIP6_hus' suffisent)

- Optionnelle. Dans ce cas, interpolation sur chaque jeux individuellement, avec redondance éventuelle.

- Intéressante à partir des P2

- Zoom temporaire factice, en attente du devel. de la fonctionnalité Xios de zoom sur plage discontinue (d'ici 1 ou 2 semaines)

- Hypothèse (vérifiée) : aucune des variables « ambigues » (i.e. cell_method='where something') n'est demandée en niveau pression *(=> 1 petite modif supplémentaire dr2xml mpmoine->senesi)*

- En place dans dr2xml. Reste à tester l'utilisation du file-def 'dr2xml_arpsfx.xml' incluant ces unions+zooms

M-P Moine - Réunion CMIP6-Tech – 30/03/2017

```xml
<field_group>
    <field field_ref= "CMIP6_zg27_plev27"          name= "zg27"       [...] > [...] </field>
    <field field_ref= "CMIP6_zg19_plev19"          name= "zg19"       [...] > [...] </field>
    <field field_ref= "CMIP6_zg12_plev12"          name= "zg12"       [...] > [...] </field>
    <field field_ref= "CMIP6_zg7h_plev7h"          name= "zg7h"       [...] > [...] </field>
    <field field_ref= "CMIP6_zg"                   name= "zg"         [...] > [...] </field>
    <field field_ref= "CMIP6_zg_plev8"             name= "zg"         [...] > [...] </field>
    <field field_ref= "CMIP6_zg10_plev10"          name= "zg10"       [...] > [...] </field>
    <field field_ref= "CMIP6_zg23_plev23"          name= "zg23"       [...] > [...] </field>
    <field field_ref= "CMIP6_zg_plev39"            name= "zg"         [...] > [...] </field>
</field_group >

<field_definition>
    <field id= "CMIP6_zg_union "      field_ref= "CMIP6_zg "         axis_ref= "union_plevs_zg"    />
    <field id= "CMIP6_zg27_plev27 "   field_ref= "CMIP6_zg_union "   axis_ref= "zoom_plev27_zg"    />
    <field id= "CMIP6_zg19_plev19 "   field_ref= "CMIP6_zg_union "   axis_ref= "zoom_plev19_zg"    />
    <field id= "CMIP6_zg_plev8 "      field_ref= "CMIP6_zg_union "   axis_ref= "zoom_plev8_zg"     />
    <field id= "CMIP6_zg_plev19"      field_ref= "CMIP6_zg_union "   axis_ref= "zoom_plev19_zg"    />
    <field id= "CMIP6_zg7h_plev7h "   field_ref= "CMIP6_zg_union "   axis_ref= "zoom_plev7h_zg"    />
    <field id= "CMIP6_zg_plev39 "     field_ref= "CMIP6_zg_union "   axis_ref= "zoom_plev39_zg"    />
    <field id= "CMIP6_zg23_plev23 "   field_ref= "CMIP6_zg_union "   axis_ref= "zoom_plev23_zg"    />
    <field id= "CMIP6_zg10_plev10 "   field_ref= "CMIP6_zg_union "   axis_ref= "zoom_plev10_zg"    />
    <field id= "CMIP6_zg12_plev12 "   field_ref= "CMIP6_zg_union "   axis_ref= "zoom_plev12_zg"    />
</field_definition>

<axis_definition>
    <axis id= "union_plevs_zg" positive="down" n_glo="54" value=" (0,54) [ 97500. 95000. 92500. 90000. 9000. 87500. 85000. 82500. 80000. 8000. 77500. 75000. 70000. 7000. 700.      70. 7. 65000. 60000. 55000. 50000. 5000. 500. 50. 5. 45000. 40000. 40. 35000. 30000. 3000. 300. 30. 3. 25000. 22500. 20000. 2000. 200. 20. 17500. 17000. 15000. 1500. 150. 15.     13000. 12500. 11500. 100000. 10000. 1000. 100.
10.] " name="plev" standard_name="air_pressure" long_name="pressure" unit="Pa">38524        <interpolate_axis type="polynomial" order="1" coordinate="CMIP6_pfull"/>38525         </axis>
    <axis id= "zoom_plev39_zg"     axis_ref= "union_plevs_zg" > <zoom_axis begin= "3"            n= "39" />      </axis>
    <axis id= "zoom_plev23_zg"     axis_ref= "union_plevs_zg" > <zoom_axis begin= "40"           n= "23" />      </axis>
    <axis id= "zoom_plev12_zg"     axis_ref= "union_plevs_zg" > <zoom_axis begin= "200"          n= "12" />      </axis>
    <axis id= "zoom_plev8_zg"      axis_ref= "union_plevs_zg" > <zoom_axis begin= "1000"         n= "8"  />      </axis>
    <axis id= "zoom_plev19_zg"     axis_ref= "union_plevs_zg" > <zoom_axis begin= "100"          n= "19" />      </axis>
    <axis id= "zoom_plev19_zg"     axis_ref= "union_plevs_zg" > <zoom_axis begin= "100"          n= "19" />      </axis>
    <axis id= "zoom_plev10_zg"     axis_ref= "union_plevs_zg" > <zoom_axis begin= "1000"         n= "10" />      </axis>
    <axis id= "zoom_plev7h_zg"     axis_ref= "union_plevs_zg" > <zoom_axis begin= "5000"         n= "7"  />      </axis>
    <axis id= "zoom_plev27_zg"     axis_ref= "union_plevs_zg" > <zoom_axis begin= "10000"        n= "27" />      </axis>
</axis_definition>
```

Cas de "zg" demandé
sur 8 jeux de niveaux de pression.

```
<field_group>
    <field field_ref= "CMIP6_ta27_plev27"              name= "ta27"        [...] > [...]  </field>
    <field field_ref= "CMIP6_ta_plev3"                 name= "ta"          [...] > [...]  </field>
    <field field_ref= "CMIP6_ta100_p100"               name= "ta100"       [...] > [...]  </field>
    <field field_ref= "CMIP6_zg7h_plev7h"              name= "zg7h"        [...] > [...]  </field>
    <field field_ref= "CMIP6_ta"                       name= " ta"         [...] > [...]  </field>
    <field field_ref= "CMIP6_ta700_p700"               name= "ta700"       [...] > [...]  </field>
    <field field_ref= "CMIP6_ta_plev8"                 name= "ta"          [...] > [...]  </field>
    <field field_ref= "CMIP6_ta23_plev23"              name= "ta23"        [...] > [...]  </field>
    <field field_ref= "CMIP6_ta10_plev10"              name= "ta10"        [...] > [...]  </field>
    <field field_ref= "CMIP6_ta19_plev19"              name= "ta19"        [...] > [...]  </field>
    <field field_ref= "CMIP6_ta_plev19"                name= "ta"          [...] > [...]  </field>
</field_group >


<field_definition>
    <field id= "CMIP6_ta_union "           field_ref= "CMIP6_ta "          axis_ref= "union_plevs_ta"      />
    <field id= "CMIP6_ta100_p100 "         field_ref= "CMIP6_ta_union "     axis_ref= "zoom_p100_ta"        />
    <field id= "CMIP6_ta10_plev10 "        field_ref= "CMIP6_ta_union "     axis_ref= "zoom_plev10_ta"      />
    <field id= "CMIP6_ta7h_plev7h "        field_ref= "CMIP6_ta_union "     axis_ref= "zoom_plev7h_ta"      />
    <field id= "CMIP6_ta_plev19 "          field_ref= "CMIP6_ta_union "     axis_ref= "zoom_plev19_ta"      />
    <field id= "CMIP6_ta_plev3 "           field_ref= "CMIP6_ta_union "     axis_ref= "zoom_plev3_ta"       />
    <field id= "CMIP6_ta_plev8 "           field_ref= "CMIP6_ta_union "     axis_ref= "zoom_plev8_ta"       />
    <field id= "CMIP6_ta700_p700 "         field_ref= "CMIP6_ta_union "     axis_ref= "zoom_p700_ta"        />
    <field id= "CMIP6_ta19_plev19 "        field_ref= "CMIP6_ta_union "     axis_ref= "zoom_plev19_ta"      />
    <field id= "CMIP6_ta23_plev23 "        field_ref= "CMIP6_ta_union "     axis_ref= "zoom_plev23_ta"      />
    <field id= "CMIP6_ta27_plev27 "        field_ref= "CMIP6_ta_union "     axis_ref= "zoom_plev27_ta"      />
</field_definition>


<axis_definition>
    <axis id= "union_plevs_ta" positive="down" n_glo="38" value= "(0,38) [ 97500. 95000. 92500. 90000. 87500. 85000. 82500. 80000. 77500. 75000. 70000. 7000. 700. 65000. 6000    0. 55000. 50000. 5000. 500. 45000. 40000. 40. 35000. 30000.
                                 3000. 300. 25000. 22500. 20000. 2000. 200. 17500. 15000. 12500. 100000. 10000. 1000. 100.]" name="plev" standard_nam    e="air_pressure" long_name="pressure" unit="Pa">38506
                                 <interpolate_axis type="polynomial" order="1" coordinate="CMIP6_pfull"/>38507        </axis>
    <axis id= "zoom_plev8_ta"    axis_ref= "union_plevs_ta" >    <zoom_axis begin= "1000"   n= "8"      />        </axis>
    <axis id= "zoom_plev19_ta"   axis_ref= "union_plevs_ta" >    <zoom_axis begin= "100"    n= "19"     />        </axis>
    <axis id= "zoom_p100_ta"     axis_ref= "union_plevs_ta" >    <zoom_axis begin= "10000"  n= "1"      />        </axis>
    <axis id= "zoom_p100_ta"     axis_ref= "union_plevs_ta" >    <zoom_axis begin= "10000"  n= "1"      />        </axis>
    <axis id= "zoom_plev19_ta"   axis_ref= "union_plevs_ta" >    <zoom_axis begin= "100"    n= "19"     />        </axis>
    <axis id= "zoom_plev7h_ta"   axis_ref= "union_plevs_ta" >    <zoom_axis begin= "5000"   n= "7"      />        </axis>
    <axis id= "zoom_plev23_ta"   axis_ref= "union_plevs_ta" >    <zoom_axis begin= "40"     n= "23"     />        </axis>
    <axis id= "zoom_p700_ta"     axis_ref= "union_plevs_ta" >    <zoom_axis begin= "70000"  n= "1"      />        </axis>
    <axis id= "zoom_plev10_ta"   axis_ref= "union_plevs_ta" >    <zoom_axis begin= "1000"   n= "10"     />        </axis>
    <axis id= "zoom_plev27_ta"   axis_ref= "union_plevs_ta" >    <zoom_axis begin= "10000"  n= "27"     />        </axis>
    <axis id= "zoom_plev3_ta"    axis_ref= "union_plevs_ta" >    <zoom_axis begin= "25000"  n= "3"      />        </axis>
</axis_definition>
```

Cas de "ta" demandé
sur 7 jeux de niveaux de pression
et 2 niveaux singletons.

```
<field_group >
    <field field_ref= "CMIP6_o3_plev19" name= "o3"                [...] > [...]  </field>
</field_group >

<field_definition>
    <field id= "CMIP6_o3_union"        field_ref= "CMIP6_o3"              axis_ref= "union_plevs_o3" />
    <field id= "CMIP6_o3_plev19"       field_ref= "CMIP6_o3_union"       axis_ref= "zoom_plev19_o3" />
</field_definition>

<axis_definition>
    <axis id= "union_plevs_o3" positive="down" n_glo= "19" value= "(0,19) [ 92500. 85000. 70000. 7000. 60000. 50000. 5000. 500. 40000. 30000. 3000. 25000. 20000. 2000. 15000.
            100000. 10000. 1000. 100.]" name="plev" standard_name="air_pressure" long_name="False" unit="Pa"> <interpolate_axis type="polynomial" order="1" coordinate="CMIP6_pfull"/>
    </axis>
    <axis id= "zoom_plev19_o3"   axis_ref= "union_plevs_o3" >
        <zoom_axis begin "100" n= "19" />
    </axis>
</axis_definition>
```

```
<field_group >
    <field field_ref= "CMIP6_clmcalipso_p560" name= "o3"         [...] > [...]  </field>
</field_group >

<field_definition>
    <field id= "CMIP6_clmcalispo_union"                            field_ref= "CMIP6_clmcalispo"    axis_ref= "union_plevs_clmcalispo" />
    <field id= "CMIP6_clmcalipso_p560"                             field_ref= "CMIP6_clmcalipso_union"        axis_ref= "zoom_p560_clmcalipso" />
</field_definition>

<axis_definition>
    <axis id= "union_plevs_clmcalispo" positive="down" n_glo= "1" value= "(0,0) [56000.]" name="plev" standard_name="air_pressure" long_name="False" unit="Pa"> <interpolate_axis
type="polynomial" order="1" coordinate="CMIP6_pfull"/> </axis>
    <axis id= "zoom_p560_clmcalispo"   axis_ref= "union_plevs_clmcalipso" >
        <zoom_axis begin "56000" n= "1" />
    </axis>
</axis_definition>
```