Cross-Overs — The Ultimate Guide

This information has been taken from the Earthbyte Master Plate Model Document.
Last updated: 10 Feb 2017

Two broad categories of cross-overs:

1. Preserve position of younger plate pair at cross-over
    - Preserve all stage rotations for older times—the relative position between the older plate pair will change (@xo_ys) **current default*
    - Preserve all finite rotations after the cross-over, which will result in the first stage after the cross-over being altered, but all subsequent stages being preserved (@xo_yf)

2. Preserve position of older plate pair at cross-over
    - Preserve all stage rotations for younger times—the relative position between the younger plate pair will change. Note: this will result in non-zero present day rotations! (@xo_os)
    - Preserve all finite rotations before the cross-over, which will result in the last stage before the cross-over being altered, but all previous stages being preserved (@xo_of)

Therefore, there are **4 types** of cross-overs in total!

To ignore the cross-over flag with @xo_ig

Usage:

Note: You must have pygplates in your pythonpath.
In terminal, type:

```
python fix_crossovers.py [rotation file names] -c0.1 --debug >
debug.txt
```

For example:

```
python fix_crossovers.py AUSANT_DeformingModel_2015_v2.rot
AUSLHR_DeformingModel_2015_v2.rot Andes_Flat_Slabs_2015_v2.rot
Andes_Rotations_2015_v2.rot
Eurasia_Arabia_DeformingModel_Rotations_2015_v2.rot Global_EB_250-
0Ma_GK07_2015_v2.rot Global_EB_410-250Ma_GK07_2015_v2.rot
GoM_displacements_as_poles_2015_v2.rot NAM_Flat_Slab_2015_v2.rot
NAM_displacements_as_poles_2015_v2.rot
SATL_HeineModel_Rotations_2015_v2.rot -c0.1 --debug > debug.txt
```

@xo_ys

A
A
A
A

Preserve Euler Pole

Euler Pole Must Change

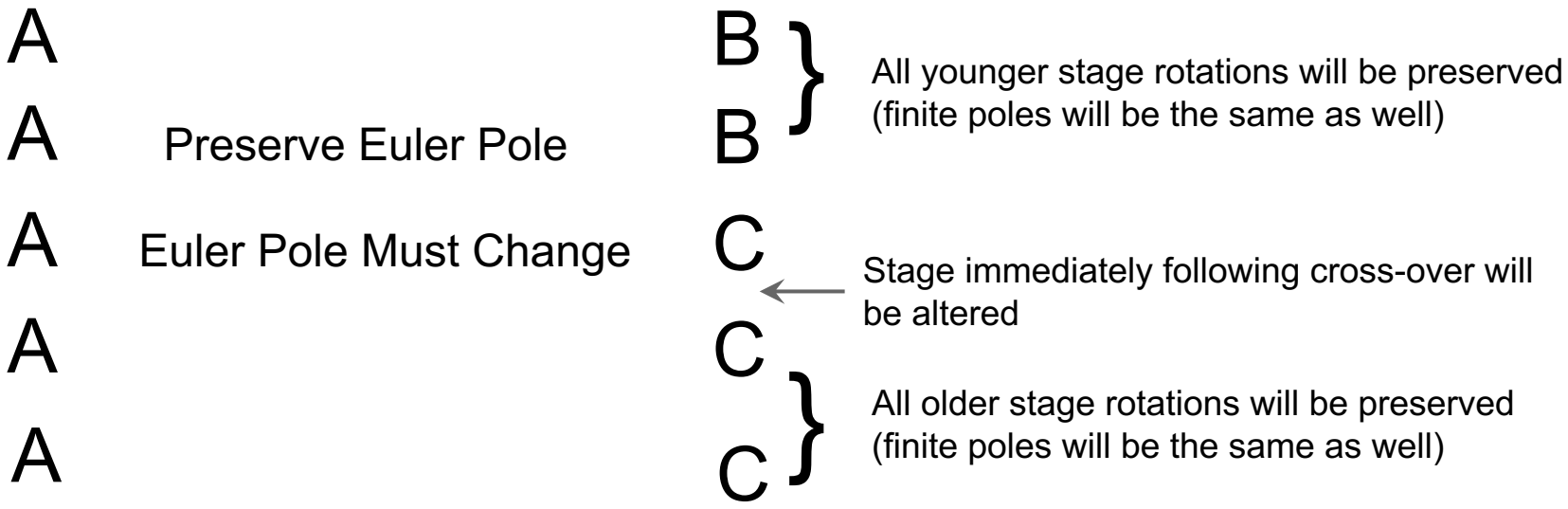
B
B

} All younger stage rotations will be preserved (finite poles will be the same as well)

C
C

} All older stage rotations will be preserved (finite poles will change)

@xo_yf


A
A
A
A
A
Preserve Euler Pole
Euler Pole Must Change
B
B
All younger stage rotations will be preserved
(finite poles will be the same as well)
C
Stage immediately following cross-over will
be altered
C
C
All older stage rotations will be preserved
(finite poles will be the same as well)

@xo_os

A 0.0 NON ZERO POLE

A

A Euler Pole Must Change

A Preserve Euler Pole

A

B This will result in non-zero present day rotations!!!!!

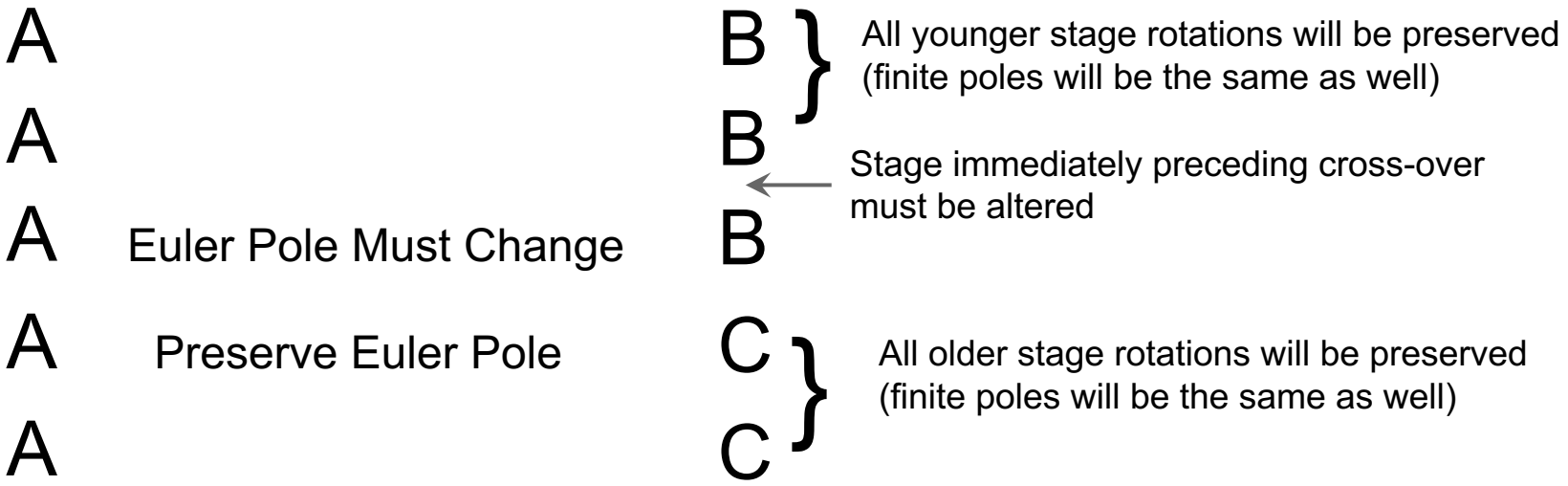
B } All younger stage rotations will be preserved (finite poles will change)

B

C } All older stage rotations will be preserved (finite poles will be the same as well)

C

@xo_of


A
A
A
A
A
A
Euler Pole Must Change
Preserve Euler Pole
B
B
B
C
C
All younger stage rotations will be preserved
(finite poles will be the same as well)
Stage immediately preceding cross-over
must be altered
All older stage rotations will be preserved
(finite poles will be the same as well)

@xo_ig

A		B
A		B
A	Preserve Euler Pole	B
A	Preserve Euler Pole	C
A		C

Cross-over is ignored, even if it’s no longer correct.