

## *Supplementary Material*

### **1 SUP1: Station List and Station Misalignment**

In Table1.xlsx the stations of the Swath-D complementary network and AlpArray Backbone stations used for the single layer and two-layer splitting analysis are listed. The first row contains the station name (DXXXG is the combined data set for stations DXXXA, DXXXB, etc.), the second row defines the network code, the third and 4<sup>th</sup> row are the start time and end time of the interval for the misalignment (5<sup>th</sup> row) and its standard deviation (6<sup>th</sup> row) being valid.

### **2 SUP2: Individual splitting results**

In Table2.xlsx the individual splitting results for each station are listed. The first and second row correspond to station and network code (see above). The third row defines the origin time of the event used for the analysis, the 4<sup>th</sup> row its corresponding phase and the 5<sup>th</sup> row its Backazimuth. The 6<sup>th</sup> to 8<sup>th</sup> row provide the splitting time, minimum and maximum splitting time given by the error surface. The 9<sup>th</sup> to 11<sup>th</sup> row provide the fast axis direction and its error similarly. The last row provides the assigned category.

### **3 SUP3: 2-layer joint splitting results of clusters**

In Table3.xlsx the 2-layer joint splitting results from the cluster analysis are listed. The first and second row correspond to station and network code (see above). The third row provides the information to which group this station has been assigned to in the cluster analysis. The following rows provide the results from the bootstrapping analysis of the groups with the splitting time, its error, the fast axis direction and the corresponding error first for the lower layer followed by the results for the upper layer.