

# Visualization Seismicity Model Mechanisms

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## 1 Introduction

TSUMAPS-NEAM has two basic types of seismicity: One is Predominant Seismicity (PS) for the large subduction earthquakes. It involves 3D fault geometry and may have heterogeneous slip. All other seismicity is modelled as Background Seismicity (BS), which is defined as probability density function over different earthquake mechanisms for geographical cells. An attempt to visualize these PDF is made in this document.

## 2 Mode cellular, 5 km cut-off

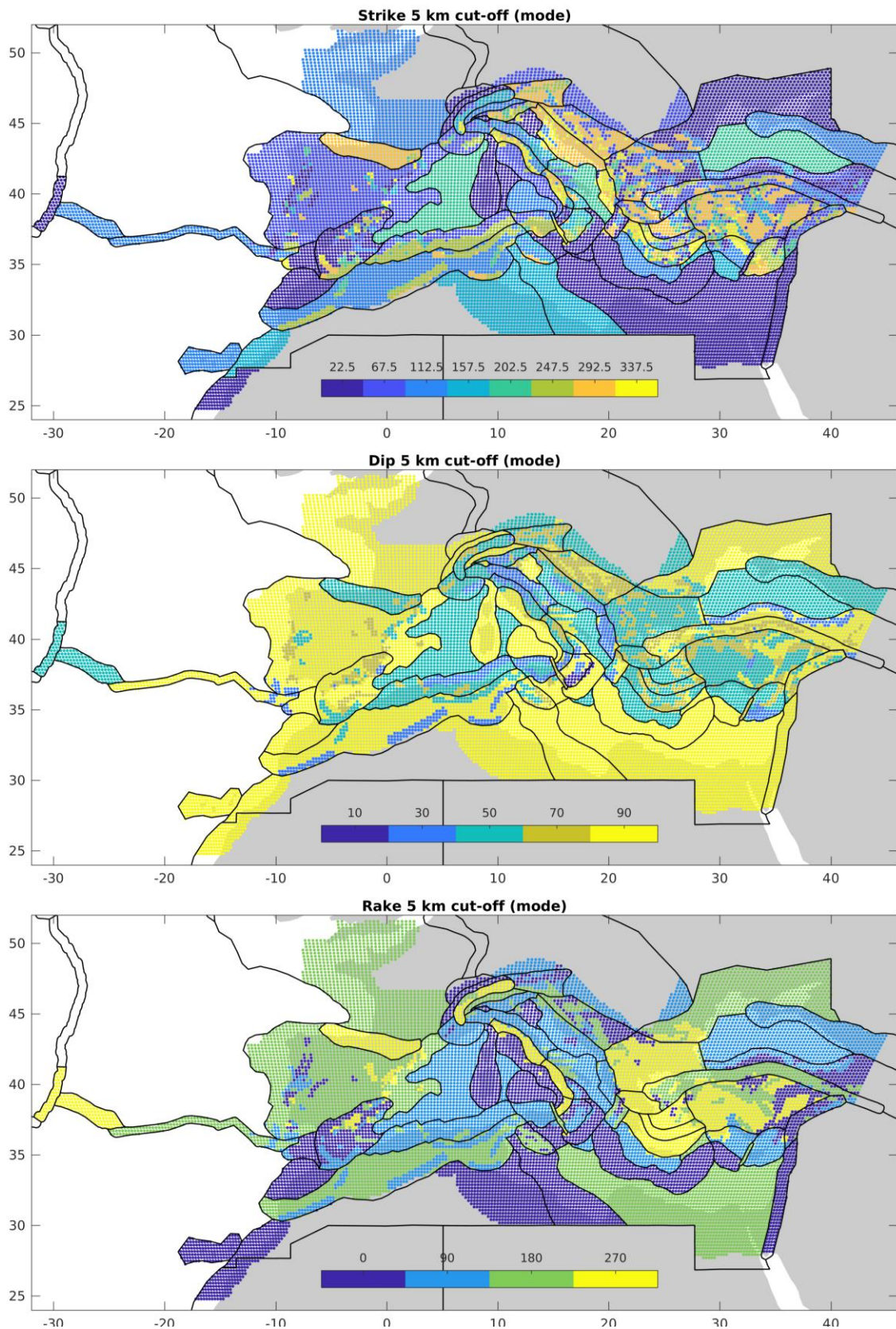


Fig. 1: Mode of the probability distribution of crustal earthquake mechanism (BS) in the TSUMAPS cells with a cut-off distance to PS geometry of 5 km. From file: 'SanityCheck\_allRegionsMode\_CO1.txt'. Mode is not always unique, see: section Error. L'origine riferimento non è stata trovata..

### 3 Mode difference with respect to cut-off depth (5/10 km)

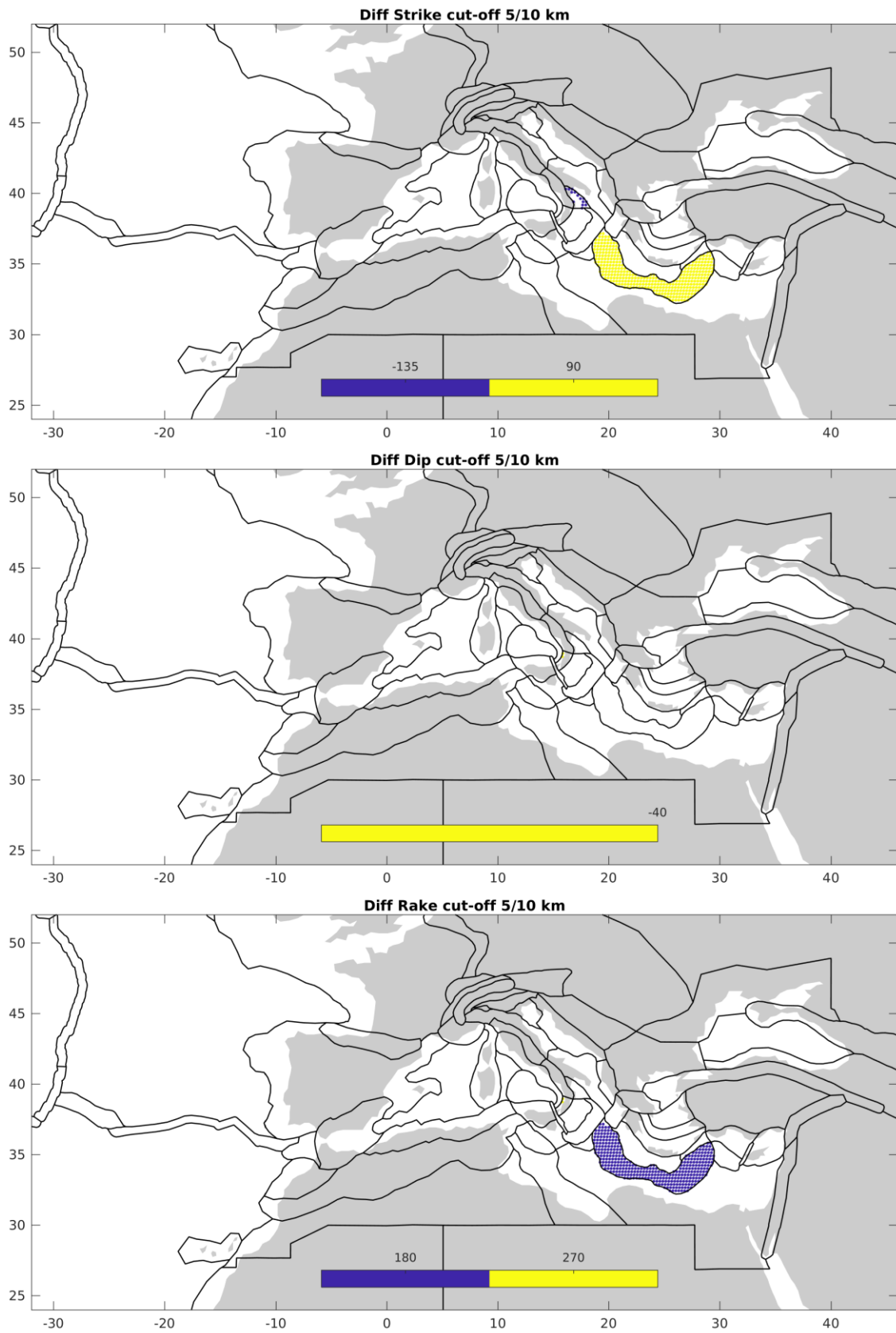


Fig. 2: Difference of modes of cells for 5 and 10 km cut-off distance. From: 'SanityCheck\_allRegionsMode\_CO2.txt'-'SanityCheck\_allRegionsMode\_CO1.txt'.

## 4 Mode of Sorensen regionalization

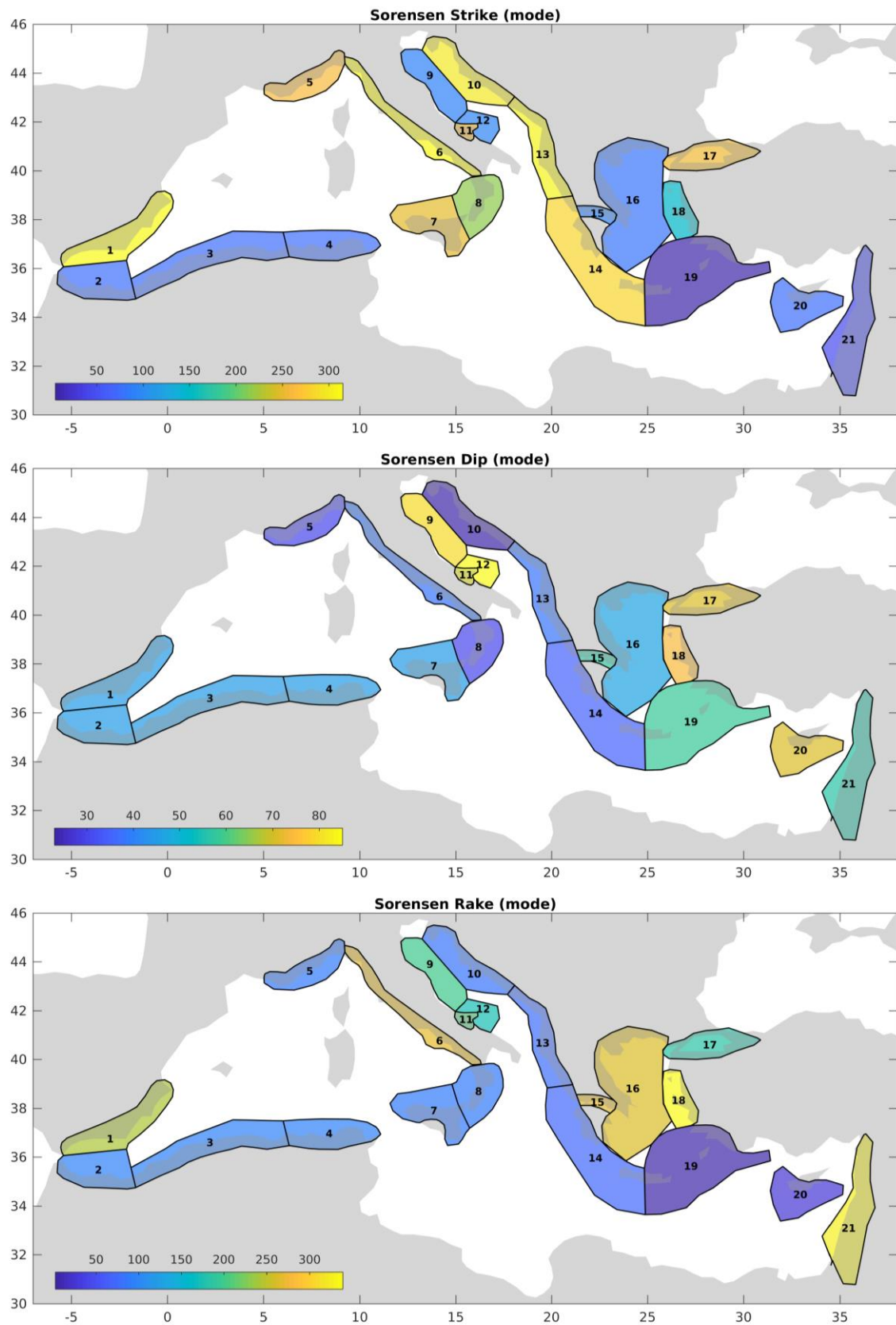


Fig. 3: Center of most probable (circular) interval of probability distribution for earthquake mechanism as in Sorensen et al. 2012, Table 2. (In some cases not unique).



## 5 Match of TSUMAPS cell mechanism mode to Sorensen regionalization

### 5.1 Strike angle

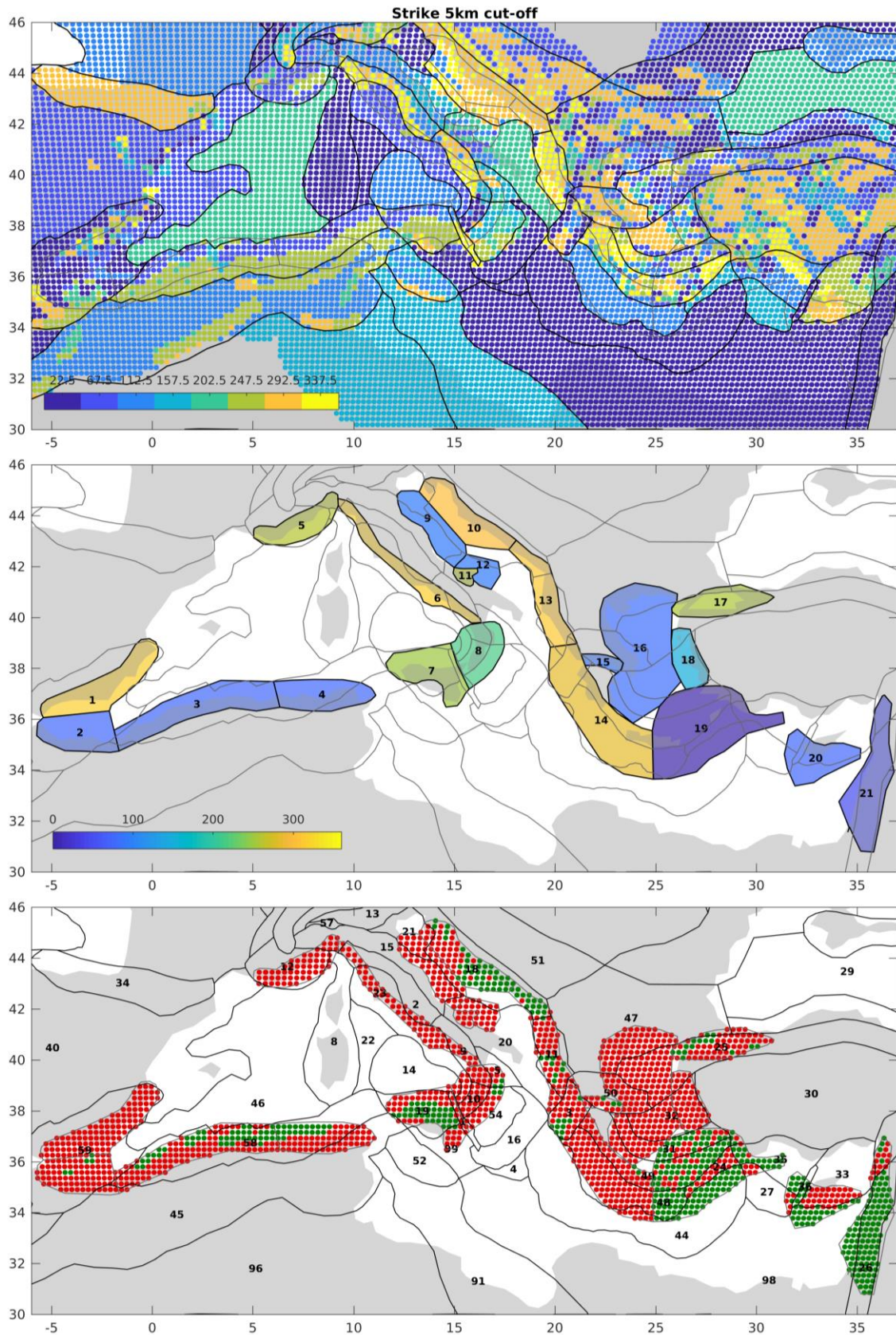


Fig. 4: Comparison of TSUMAPS cells to Sorensen regions with respect to strike angle. Green if TSUMAPS mode is within interval of Sorensen mode. Note however that TSUMAPS is only crustal (BS) seismicity, while Sorensen includes subduction seismicity (PS).



## 5.2 Dip angle

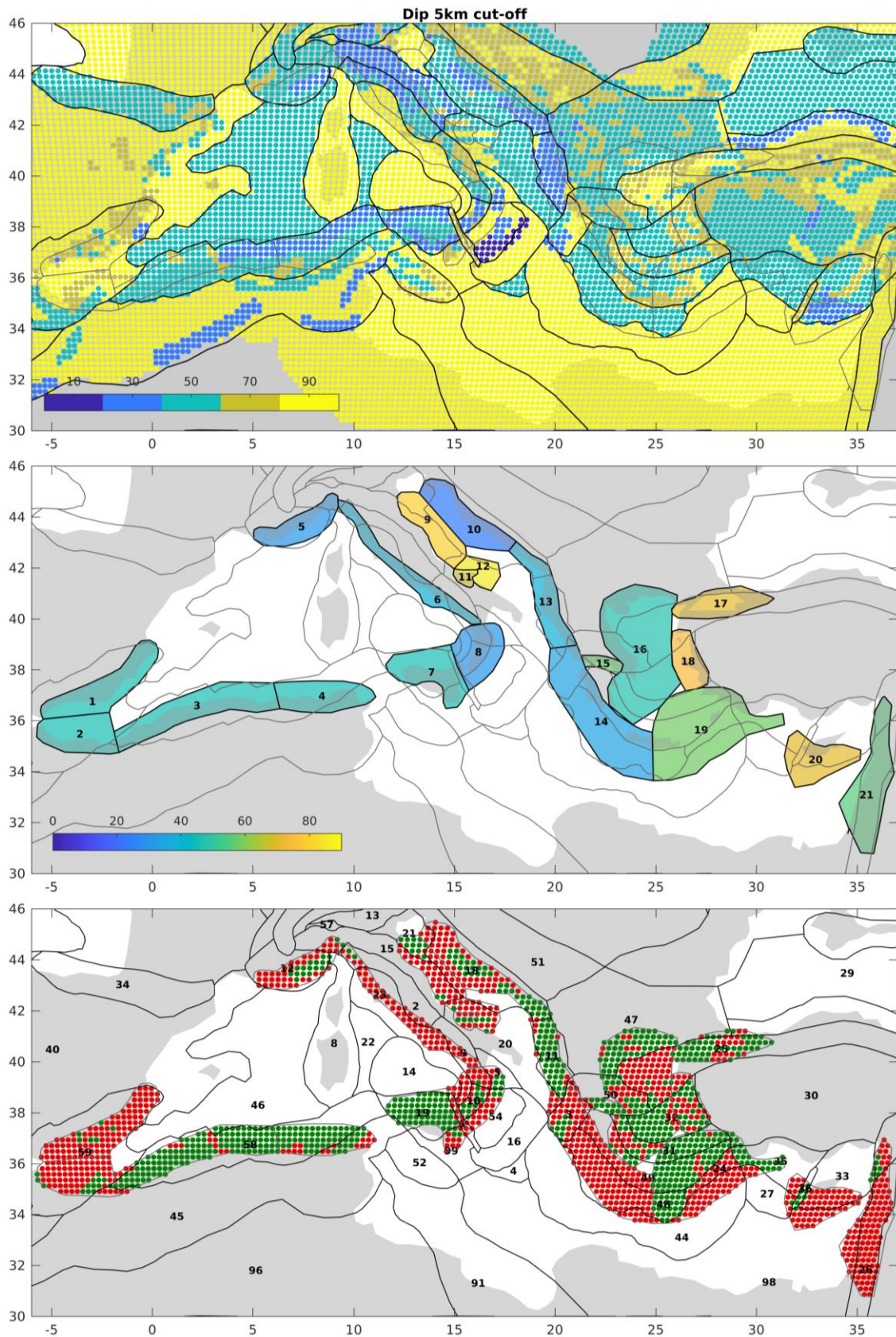


Fig. 5: Comparison of TSUMAPS cells to Sorensen regions with respect to dip angle. Green if TSUMAPS mode is within interval of Sorensen mode. Note however that TSUMAPS is only crustal (BS) seismicity, while Sorensen includes subduction seismicity (PS).

## 5.3 Rake angle

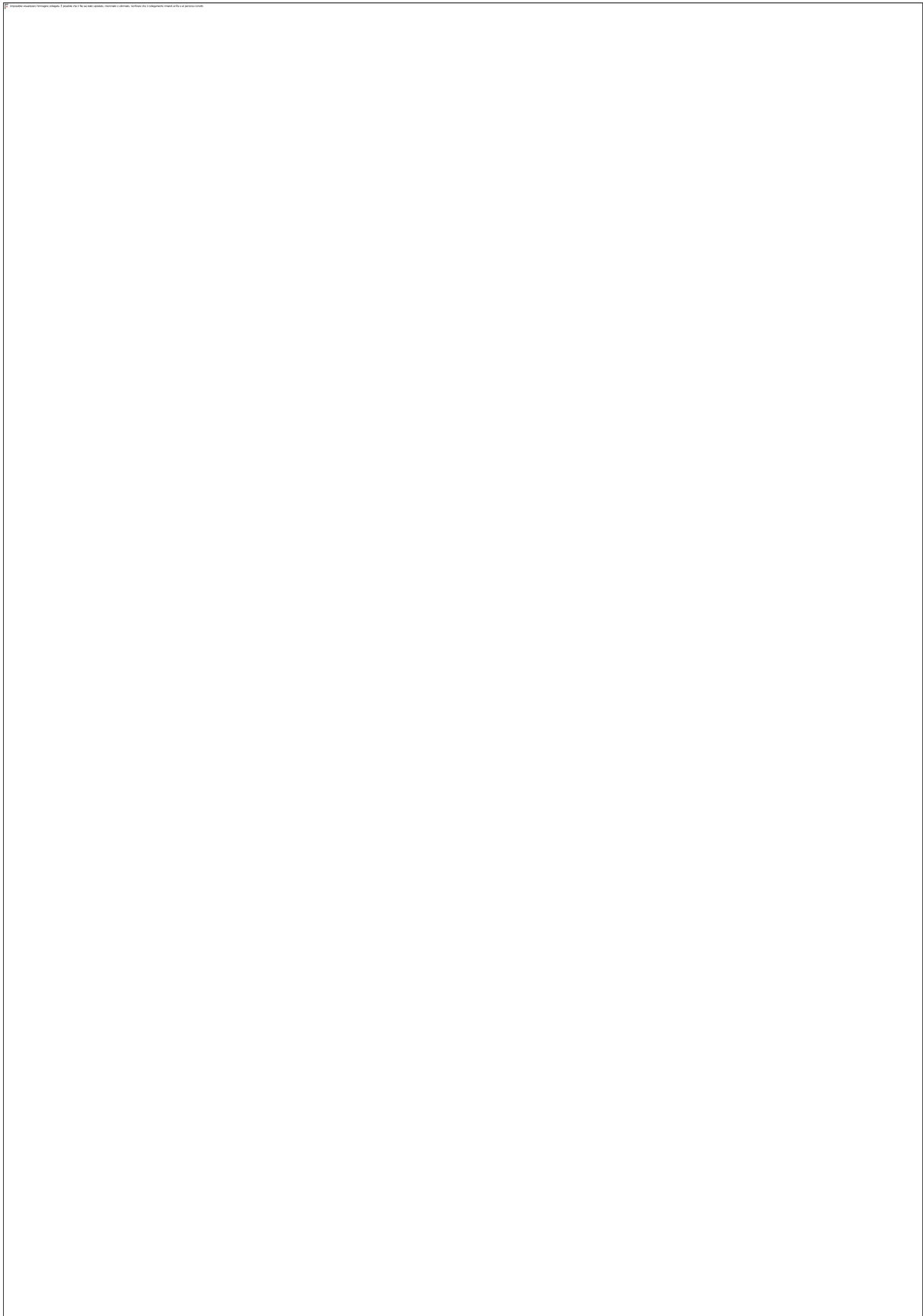


Fig. 6: Comparison of TSUMAPS cells to Sorensen regions with respect to rake angle. Green if TSUMAPS mode is within interval of Sorensen mode. Note however that TSUMAPS is only crustal (BS) seismicity, while Sorensen includes subduction seismicity (PS).



## 6 Numerosity of Mode

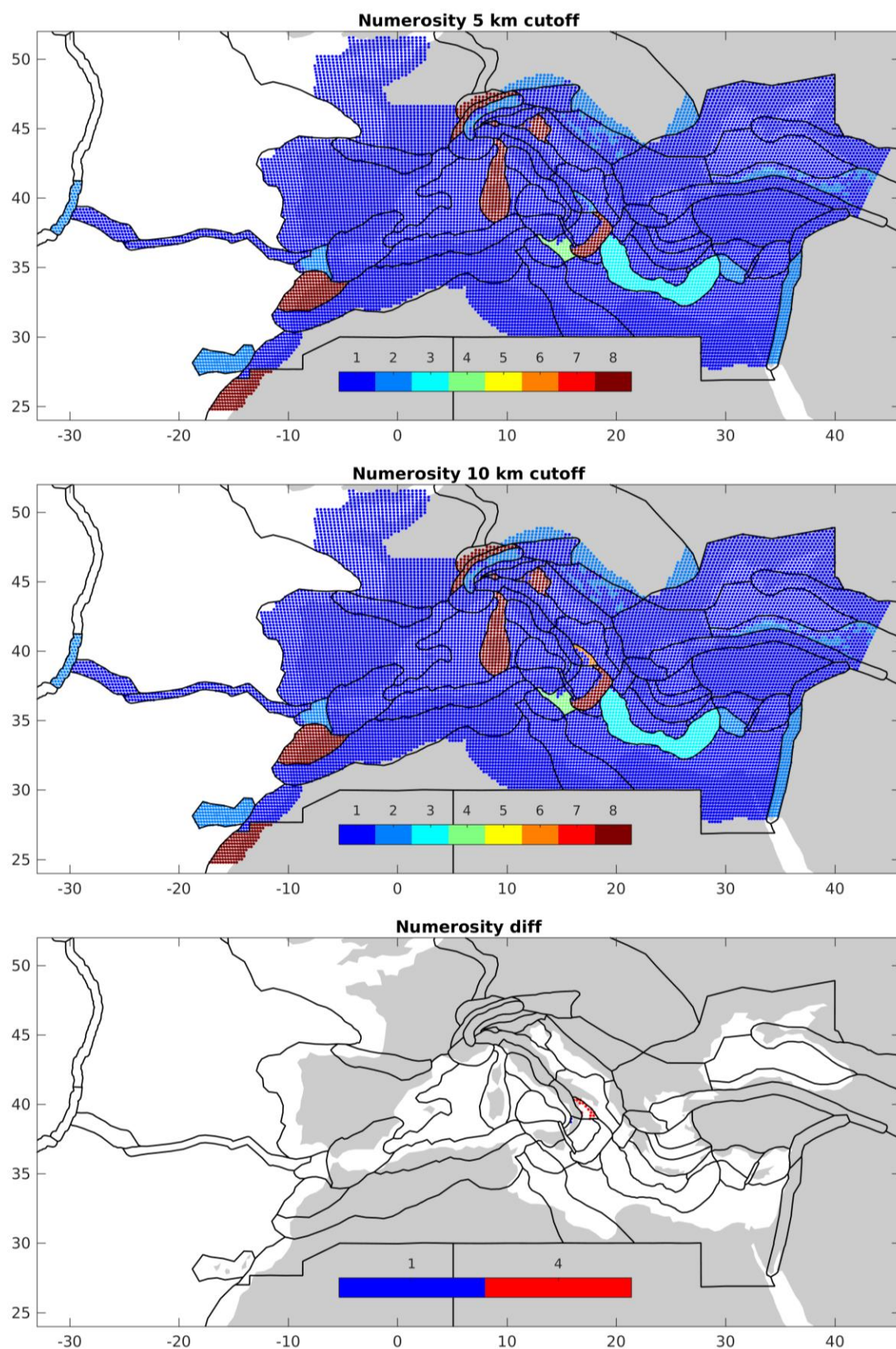


Fig. 7: Numerosity of mode of TSUMAPS cells for 5 and 10 km cut-off distance. From: 'SanityCheck\_numerosity.txt'.



## 7 Number of faults per cell

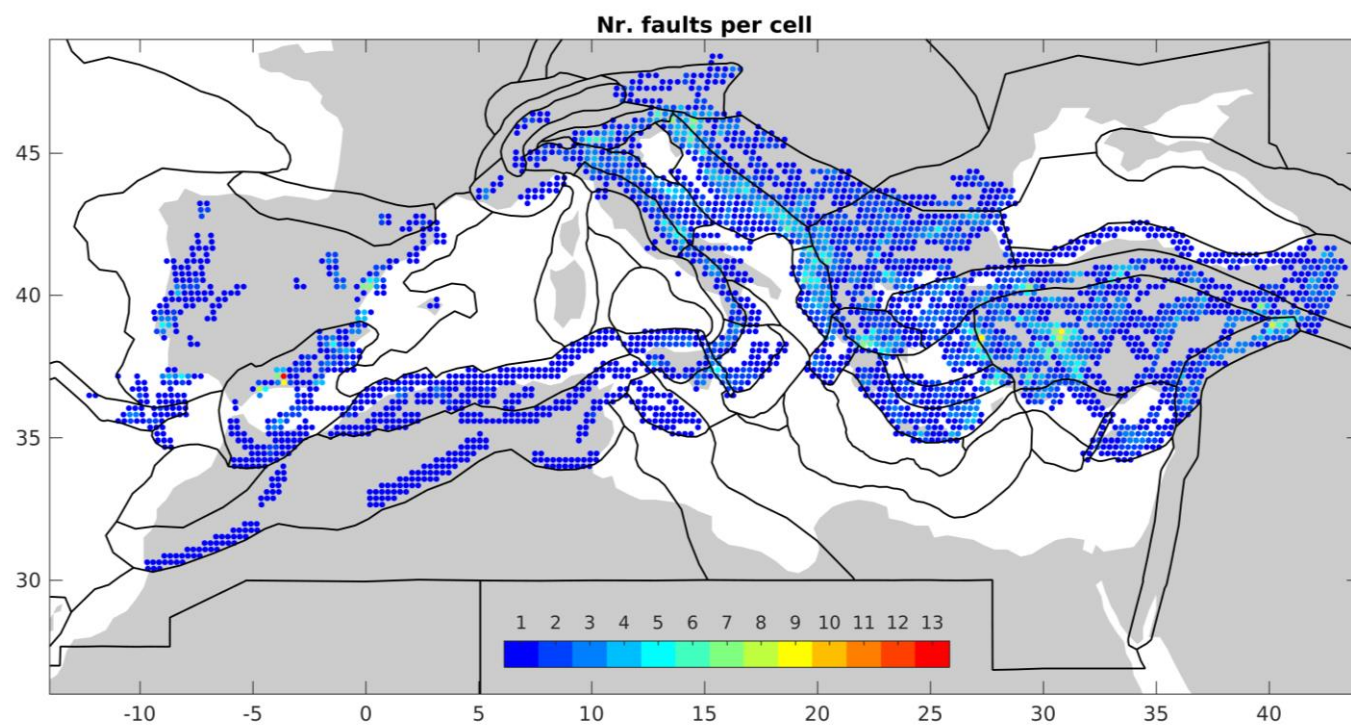


Fig. 8: Nr. of faults per TSUMAPS cells. From: 'SanityCheck\_faultNumber.txt'.

## 8 Number of CMT events per region

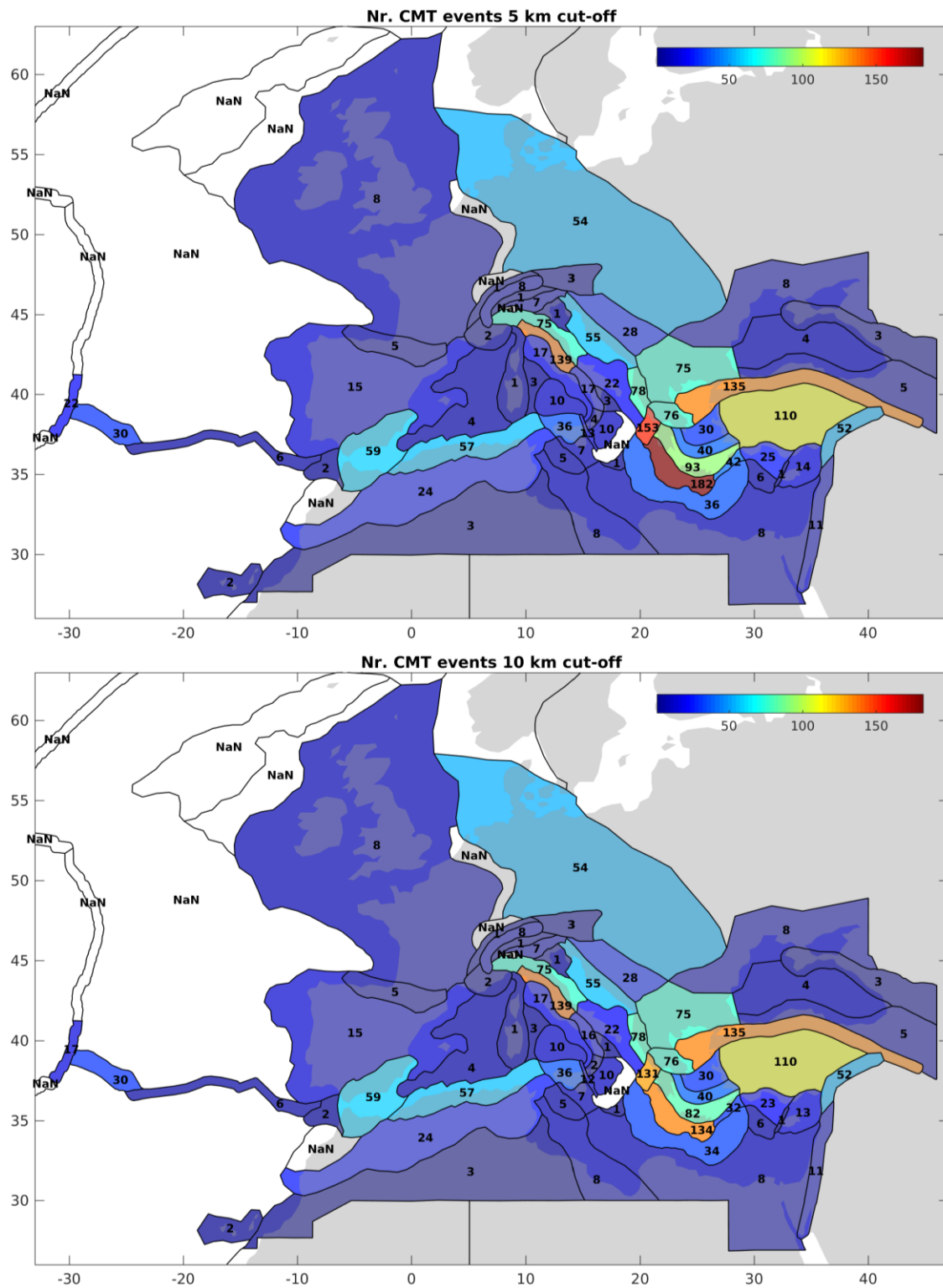


Fig. 9: Number of CMT events per TSUMAPS region with 5 and 10 km cut-off distance. From: 'SanityChecks\_regional\_nCMTev.txt'.

## 9 Mechanism probabilities per region

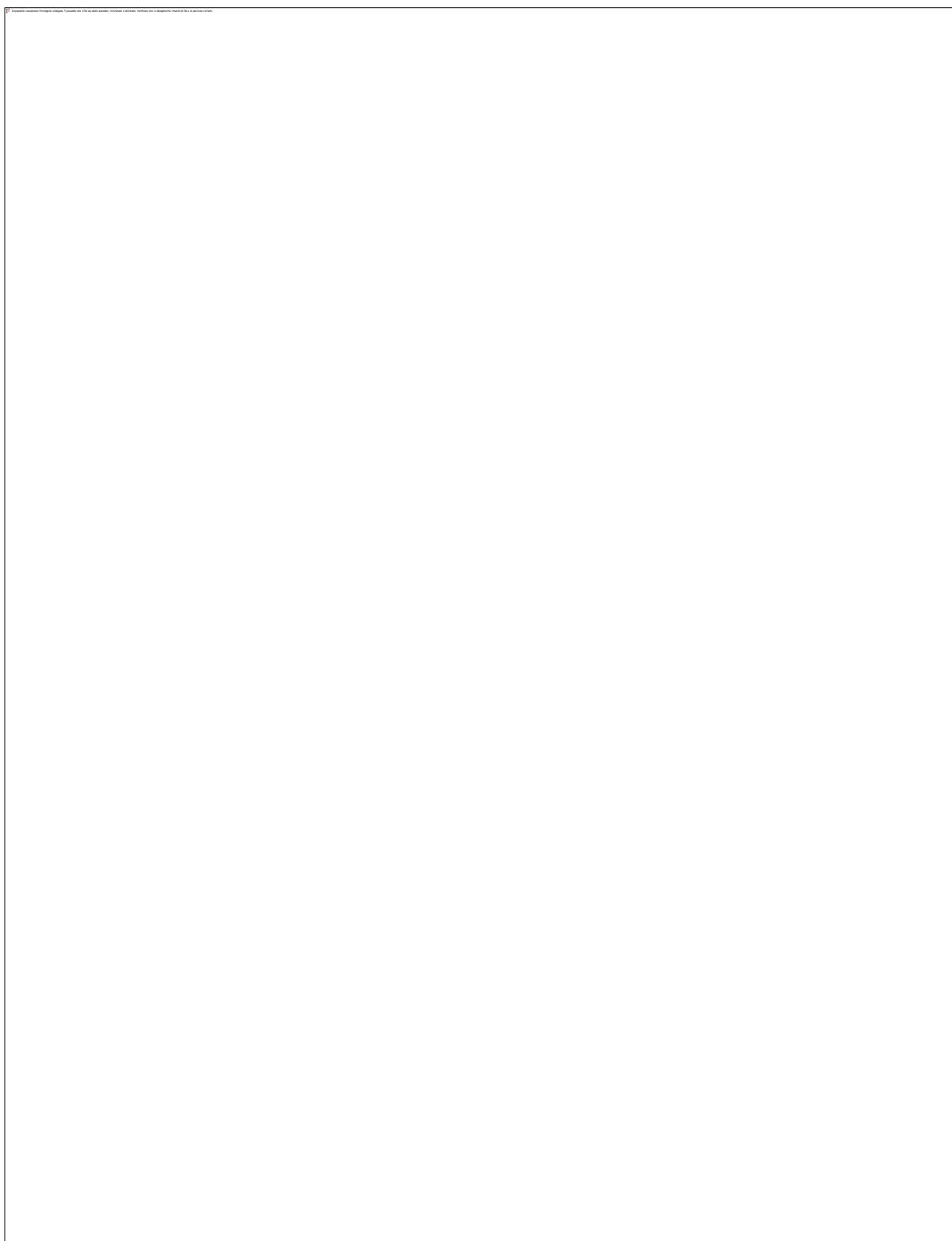


Fig. 10: Earthquake mechanism probability distribution for 68 out of 110 TSUMAPS regions. From 'SanityChecks\_regional\_distrib.txt'.

1st and 3rd panel: slices along the 4 rake angles ( $0^\circ/90^\circ/180^\circ/270^\circ$ ). x-axis: strike angle ( $22.5^\circ/67.5^\circ/112.5^\circ/157.5^\circ/202.5^\circ/247.5^\circ/292.5^\circ/337.5^\circ$ ). y-axis: dip angle ( $10^\circ/30^\circ/50^\circ/70^\circ/90^\circ$ ). White area in lower right corner since last 4 strike angles with dip= $90^\circ$  are equivalent to first 4.

2nd and 4th panel: Marginal distributions. 1st column: sum over strike. x: rake, y: dip. 2<sup>nd</sup> column: sum over dip. x: strike, y: rake. 3<sup>rd</sup> column: sum over rake. x: strike, y: dip.