

## 1.- INTRODUCTION AND METHODOLOGY

Guadiana estuary is an intertidal estuary situated in SW of Iberian Peninsula (Figure 1), the latest 50 Km of which constitutes the natural border between Spain and Portugal. Tidal influence extends to about 80 Km upstream. The Guadiana River presents a high seasonal irregularity with wet winters and dry summers.

A 3D hydrodynamic model based on the MOHID System has been developed to study the hydrodynamics of the Guadiana Estuary. The model has been validated by comparison the output with *in situ* data measurements in several points along the estuary. These points are the Symptico system and PTs marked in Figure 2. PTs, eight in total, are spaced a distance of 10 Km and were used to validate free Surface and Simpatico was used to validate the velocity along the estuary.

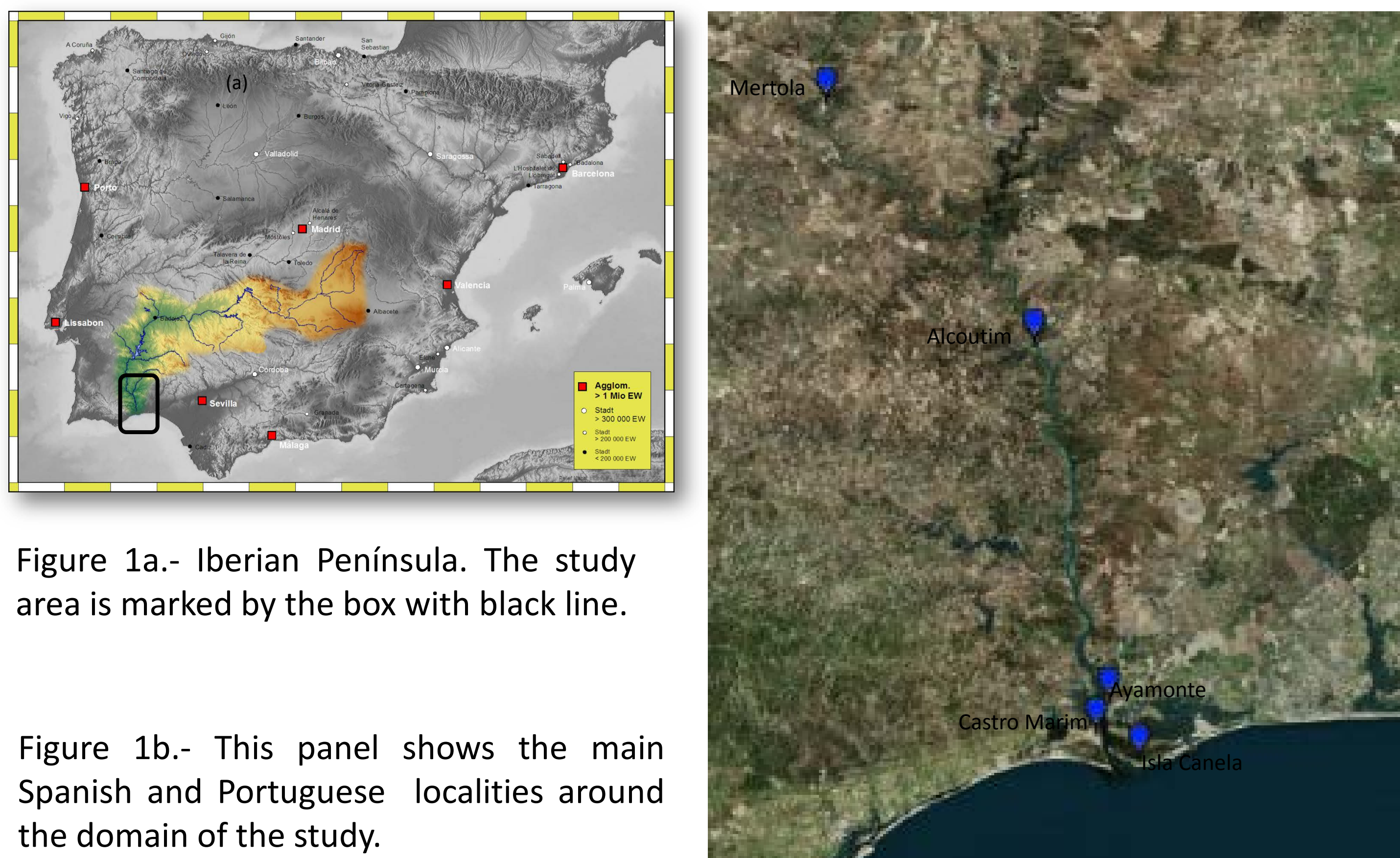


Figure 1a.- Iberian Península. The study area is marked by the box with black line.

Figure 1b.- This panel shows the main Spanish and Portuguese localities around the domain of the study.

## 2.- VALIDATION OF THE MODEL

Figure 3 shows the validation of free Surface measured *in situ* in PTs and each one show a correlation coefficient between both signals.

Figure 4 shows the validation of the component of velocity along the estuary depth integrated

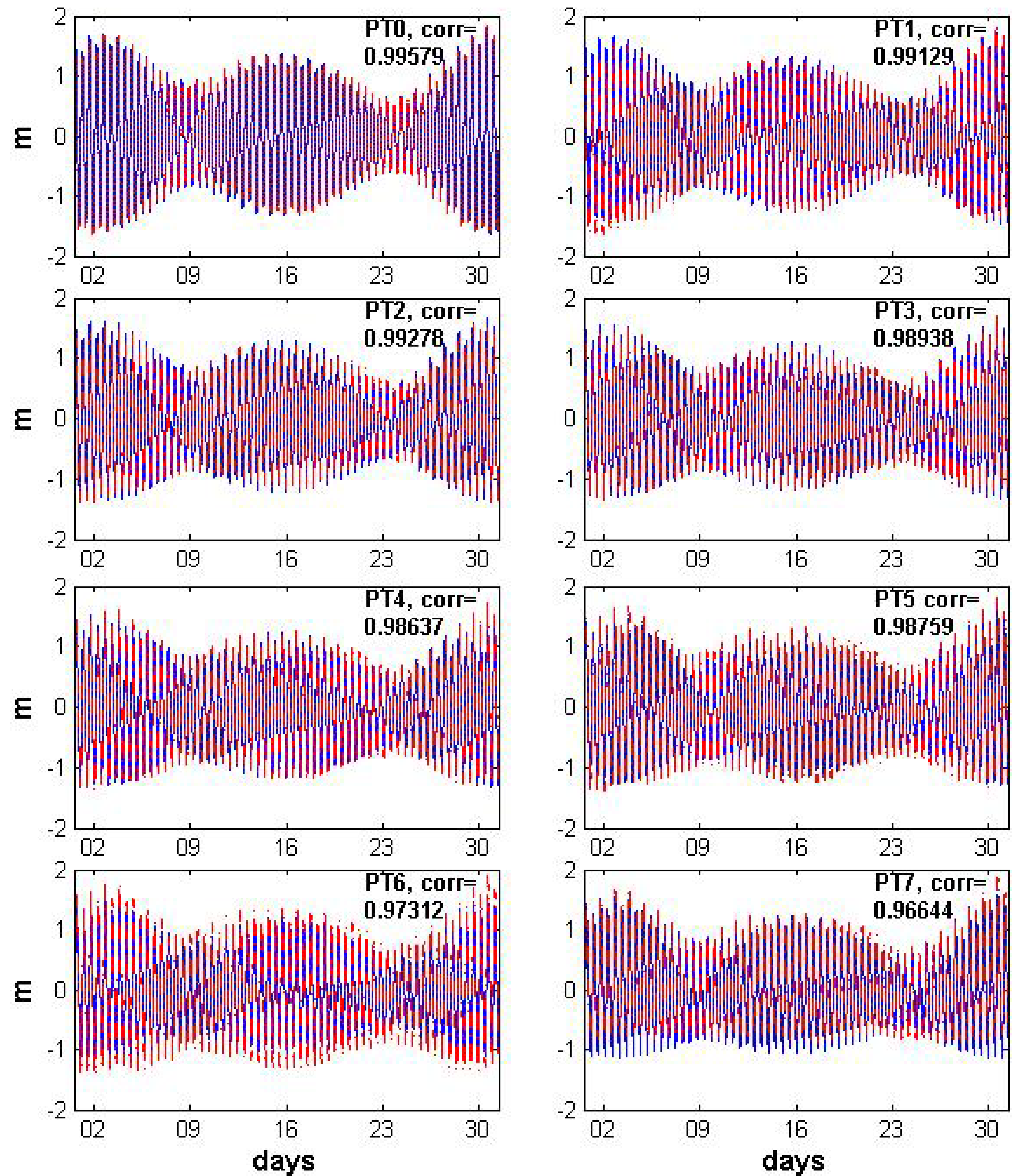


Figure 3.- Water level measured in control points located along the Guadiana estuary (Figure 2). Red points are the *in situ* measurements and solid line in blue is the output data of the model.

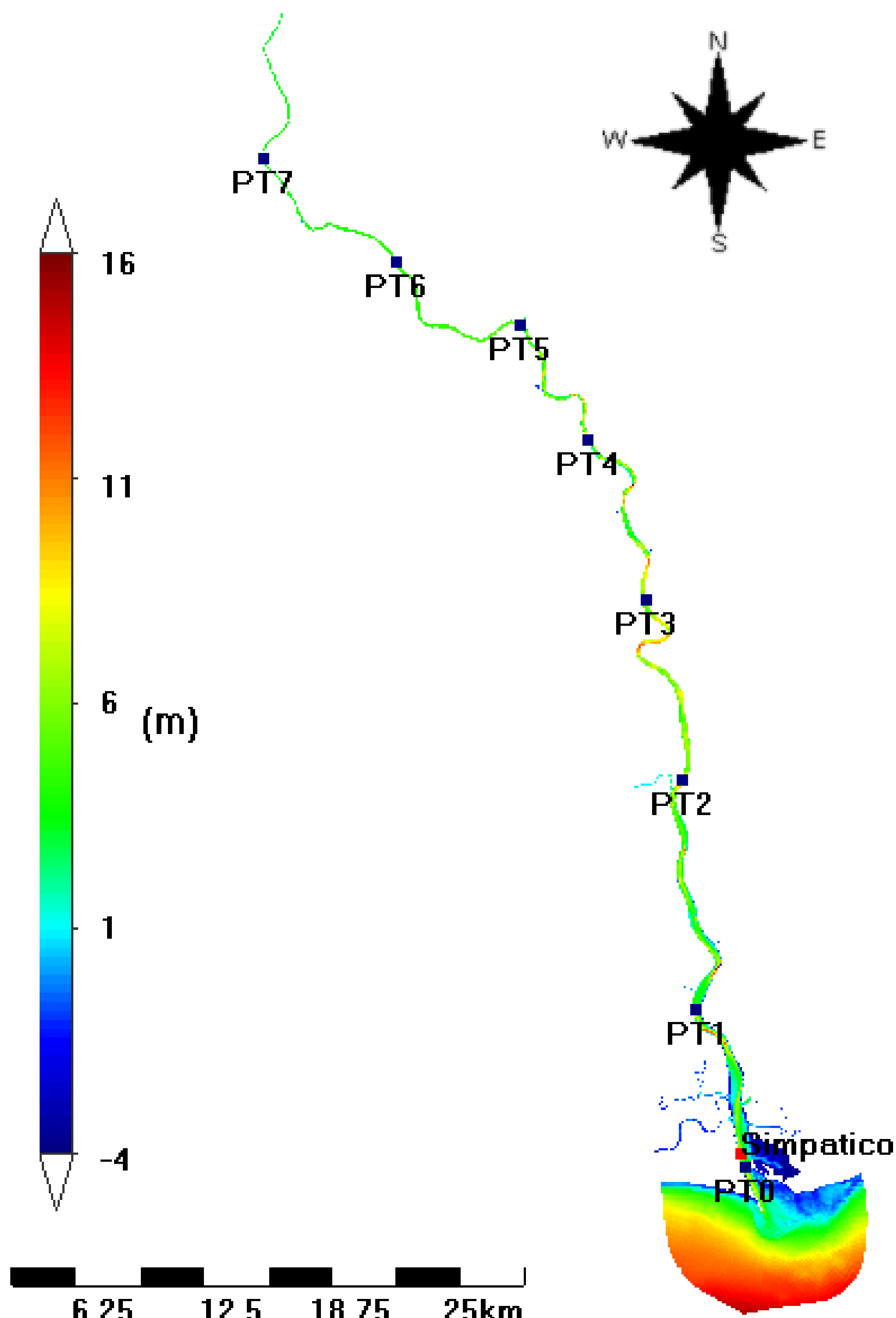


Figure 2.- Bathymetry of the Guadiana estuary. PT control points (blue points) and Simpatico system (red point) were marked.

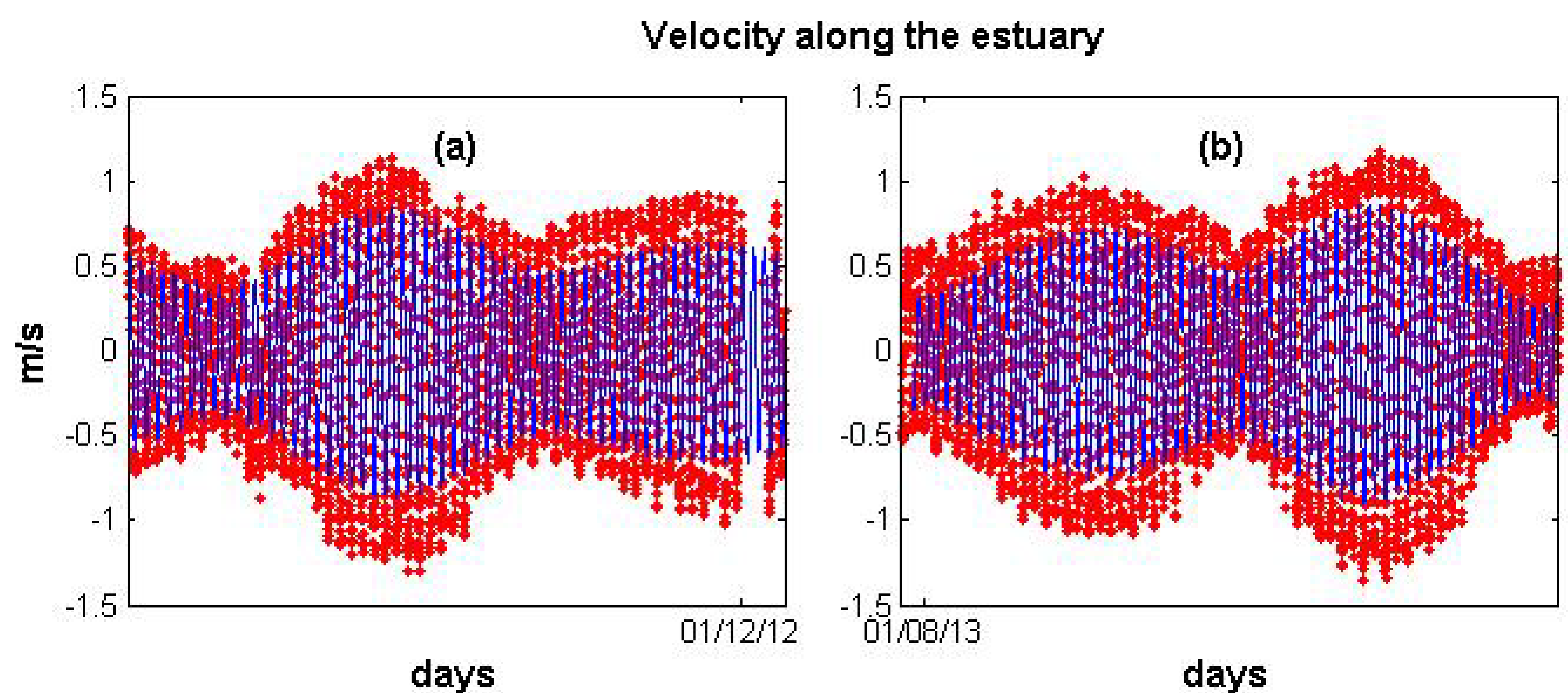


Figure 4.- Component of the velocity along the estuary in Simpatico system. Red point are the *in situ* measurements and solid line in blue are the output data of the model. Panel a) simulation during a wet month (November of 2012). Panel b) simulation during a dry month (August of 2013).

## 3.- DISCUSSION AND FUTURE WORK

1. There is a good agreement between the output of the model and *in situ* data but it is less noticeable upstream of the estuary.
2. A 3D description and more points along the estuary are needed to validate velocity components and other properties like salinity and temperature.
3. Due to output tidal signal at the head of the estuary differs considerably with *in situ* data, it could be better to study the lag between the free Surface in front of velocity ones.