The study of erosion, migration and deposition of tungsten (W) in fusion devices is important with respect to lifetime of wall components and core plasma contamination. Modelling in combination with benchmarking on experiments is essential in view of predictions for future devices like ITER and DEMO. The 3D Monte-Carlo code ERO has been applied to address W gross- and net-erosion in the divertor of JET-ILW. Comparison of modelled and measured WI emission for ELM and inter-ELM conditions has been done [1] and has helped to clarify basic mechanisms like the role of beryllium (Be) impurities for the overall sputtering, the different contributions of ELM and inter-ELM phases and the amount of W re-deposition.

The present contribution investigates dynamics of W erosion in the outer divertor of JET-ILW under simultaneous Be deposition as result of Be flux into the divertor coming from main wall erosion. Plasma conditions correspond to an unseeded H-mode with Be as the sole impurity. The simulations start with a pure W surface, under which the plasma exposure is intermixed with Be. The temporal evolution of W and Be concentrations (c_W and c_{Be} with c_W+c_{Be}=1) within an interaction layer is treated by a simple homogenous mixing model, see e.g. [2].

First, separate simulations have been performed with plasma parameters for inter-ELM and for ELM conditions. The resulting W (and Be) concentrations in steady state along the outer divertor tile 5 have differences concerning absolute values but show in principal the same shape: deep within the private flux region very small Be fluxes lead to a small net deposition, whereas the W erosion is negligible. The W concentration within the interaction layer will become zero after long exposure times. Approaching the strike point, an area of large Be net deposition appears, which is broader for inter-ELM conditions. The W concentration within this area reaches zero as a Be layer is built-up on top of the W substrate. At the strike point and deeper towards the scrape-off layer, mixed W/Be layers develop in steady state with W net erosion. The steady state W concentration at the strike point is around 0.5.

Second, a simulation with alternate inter-ELM and ELM phases has been done. An ELM frequency of 30Hz and ELM duration of 0.5ms has been assumed. Each inter-ELM and ELM phase consists of 10 simulation steps. First results indicate that the ELM duration is too small to approach steady state surface conditions. The resulting surface concentration profile of this cumulative simulation will be compared with the separated runs. Also, the resulting W net erosion profiles in equilibrium will be discussed.