1128-35-355 **Amael Le Squin*** (amael.lesquin@gmail.com). *Existence, unicity and positivity of the solution of an analytically tractable forest dynamics model.* Preliminary report.

We developed a spatially explicit and analytically tractable forest dynamics model with dispersion. Its aim is to predict changes in species distribution under climate change, taking into account dispersion and demographic parameters. Our forest model is based on the hypothesis of *perfect plasticity approximation* (Strigul et al. 2008) and uses the McKendrick–von Forster PDEs:

$$\frac{\partial N(s,x,t)}{\partial t} = -\frac{\partial G(s,s^*,t)\, N(s,x,t)}{\partial s} - \mu(s,s^*,t)N(s,x,t) \tag{1}$$

$$N(s_0,x,t) = \frac{1}{G(s_0,t)} \int_\Omega \mathcal{K}(x,y) \int_0^\infty N(s,y,t)F(s,t)\; ds\, dy \tag{2}$$

$$1 = \int_{s^*(x,t)}^\infty N(s,x,t)\mathcal{A}\big(s; s^*(x,t)\big)\, ds \tag{3}$$

The first equation is the dynamics of a cohort of size $s$ at location $x$ at time $t$. The second equation is a boundary condition and represent renewal. The last equation is a feedback function modifying the behaviour of individuals and defines a threshold $s^*$ which required some conditions on $\mathcal{A}$ (tree crown area) and $N$ to exist and being unique.

After presenting our model and discussing its meaning when adding space, we will focus on the existence, uniqueness and positivity of a weak solution. (Received March 01, 2017)