

# Extreme star forming environments

## Near and far

Eric Emsellem



# “Extreme”: what do you mean?

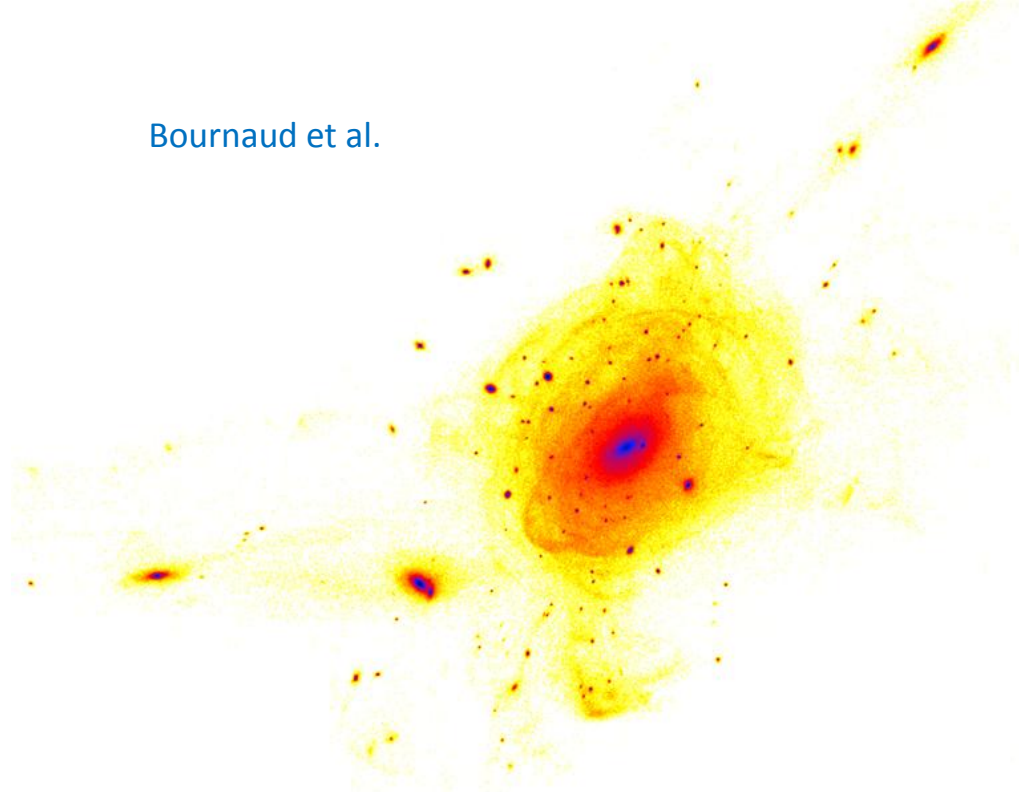
- ~ SFR, SFe ?
- ~ High densities ? Large mass (of H<sub>2</sub>?) in clumps ?
- ~ Large reservoirs ? Depletion time-scale ?
- ~ Turbulent medium ? Shocks ? Pressure ?
- ~ Metallicity ? Dust ?

*So, are we talking about e.g. :*

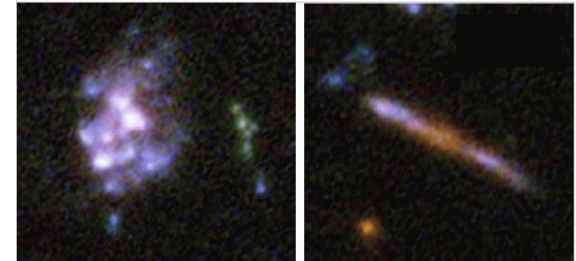
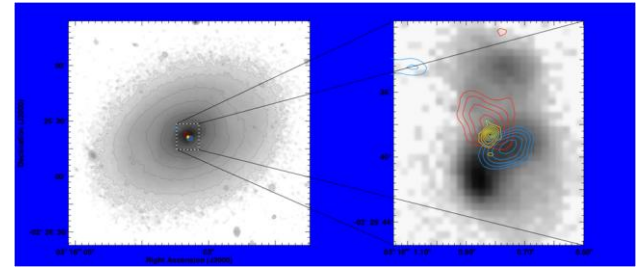
- ~ Globular cluster formation
- ~ Mergers, Strong Outflows
- ~ Clumpy galaxies
- ~ SM galaxies



Bournaud et al.



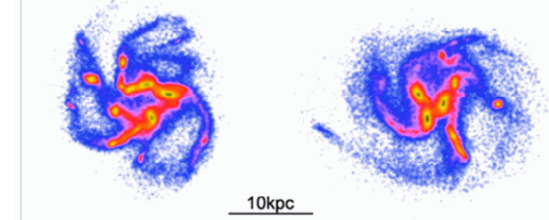
Alatalo et al.



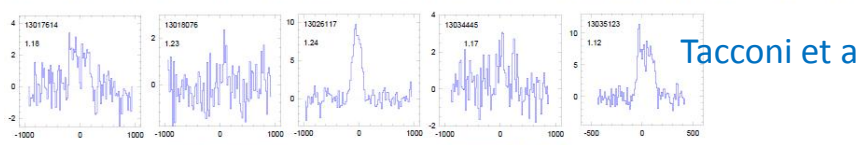
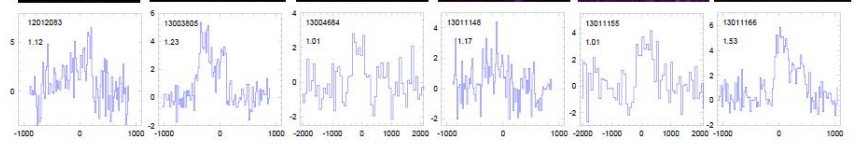
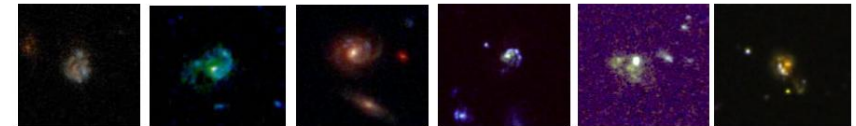
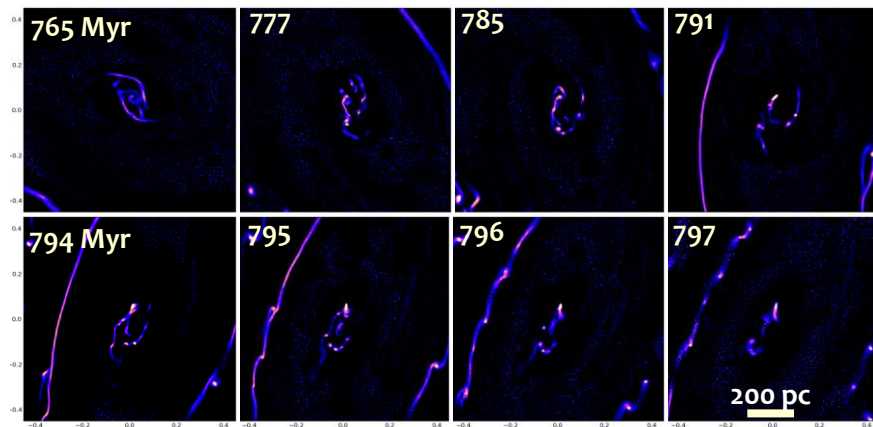
t=120 Myr

t=200 Myr

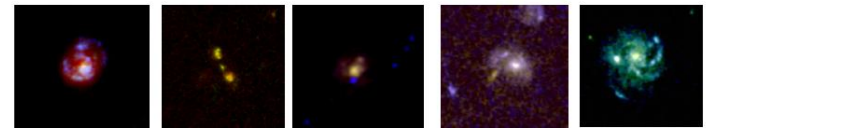
Bournaud et al.



log M\* > 11



Tacconi et al.



Renaud et al.

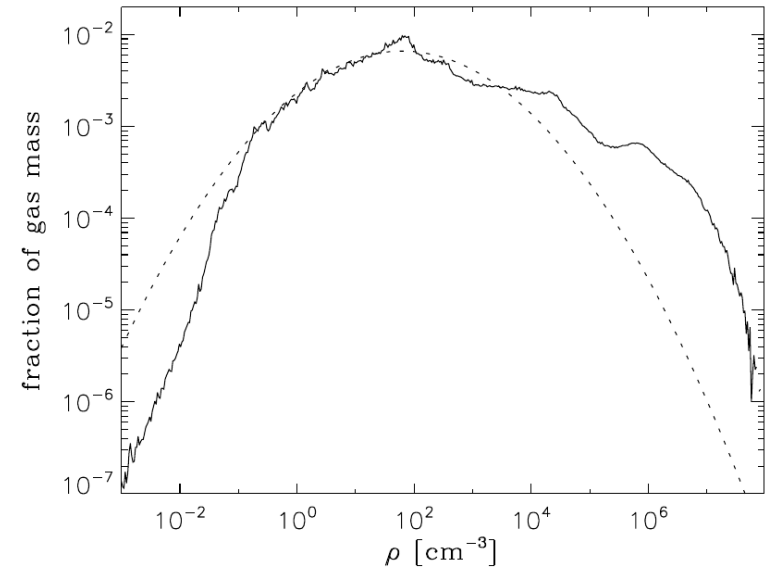


# “Extreme”: what do you mean?

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- ~ High densities ? Large mass (of H<sub>2</sub>?) in clumps ?
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So, are we talking about e.g. :

- ~ Globular cluster formation
- ~ Clumpy galaxies
- ~ Mergers, Strong Outflows
- ~ SM galaxies



*And why should these be special ?*

(is it just the PDF?)



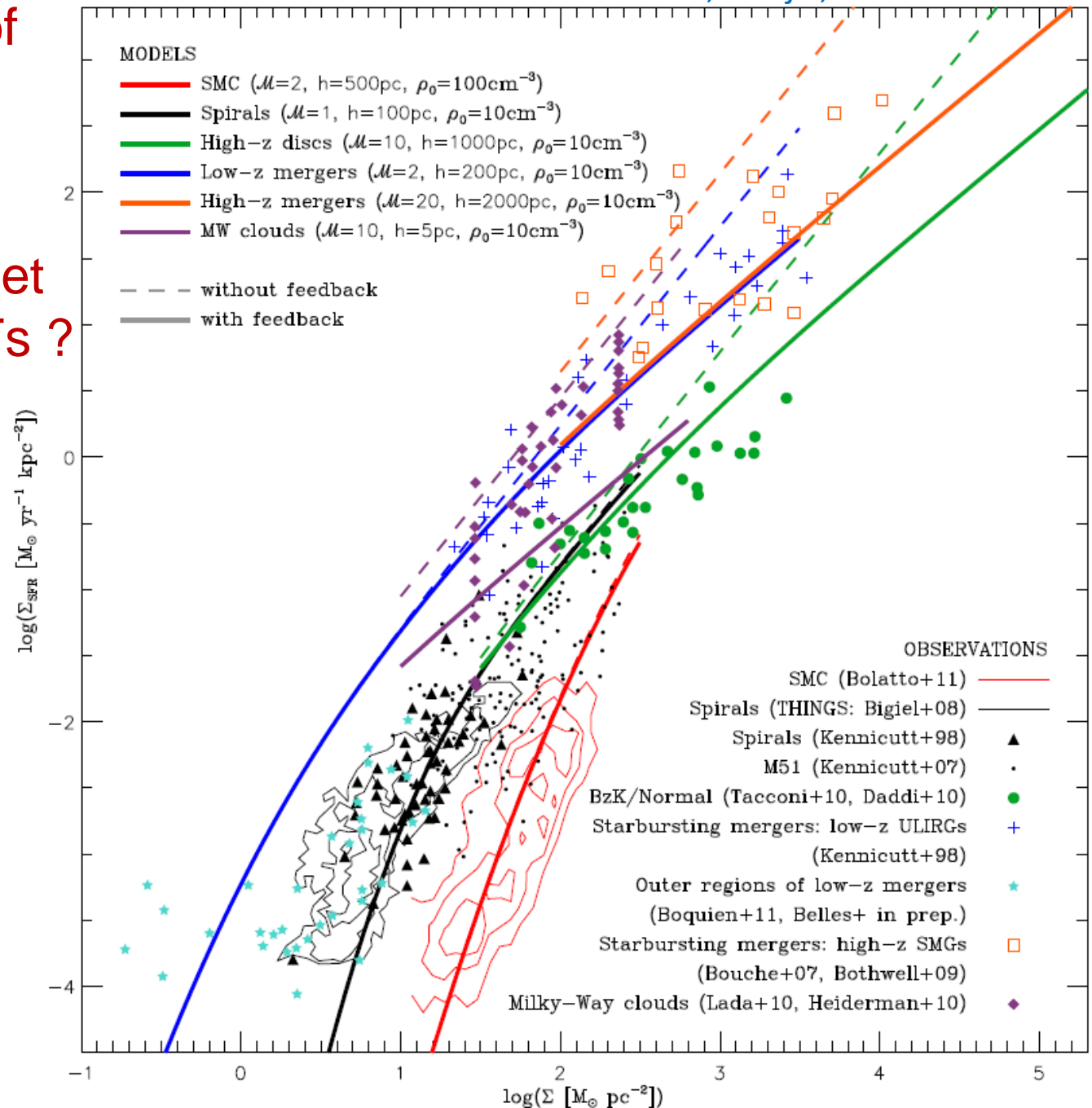
~ Importance of the PDF ?

~ How do we get different PDFs ?

~  $\mathcal{M}$

~ Density

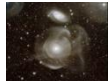
~ Self-gravity



# *Does feedback matter at all ?*

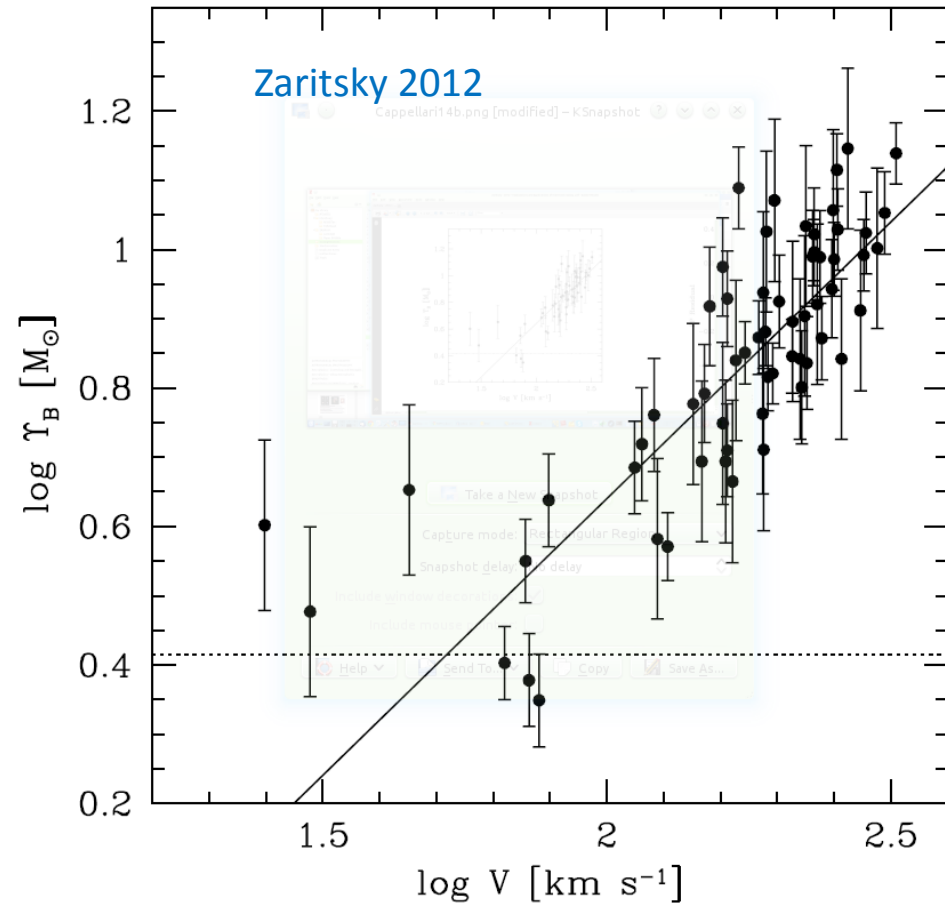
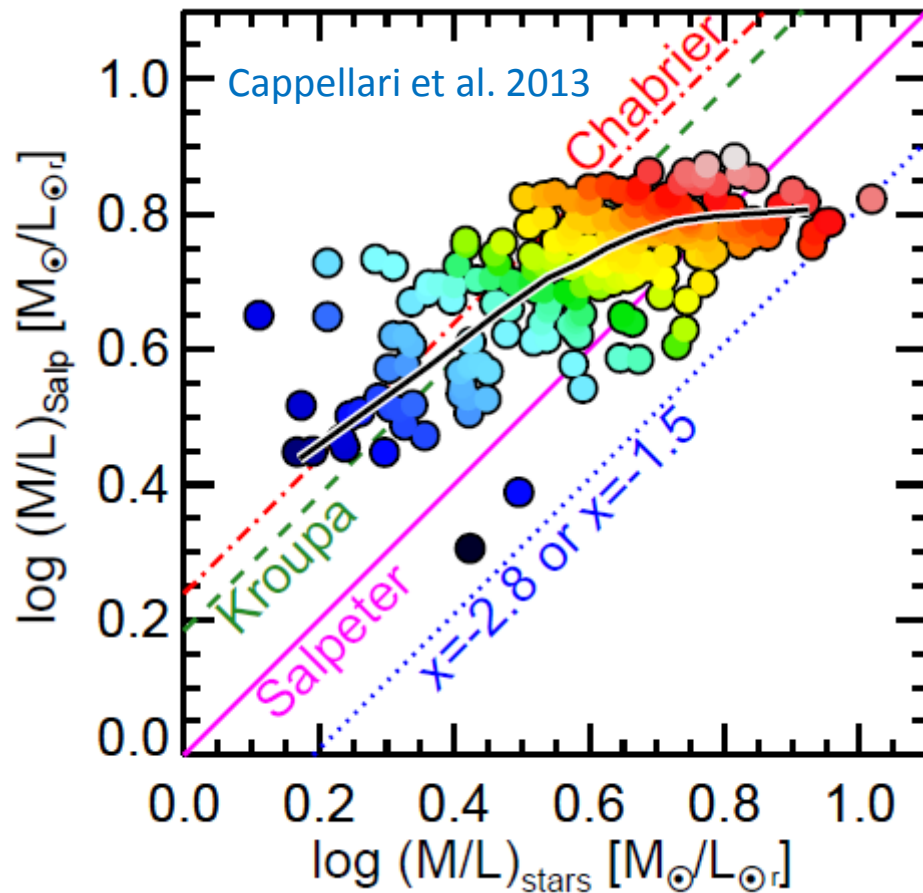
~ Feedback HAPPENS but...

- Cause or consequence ?
- (Self-)regulation ?

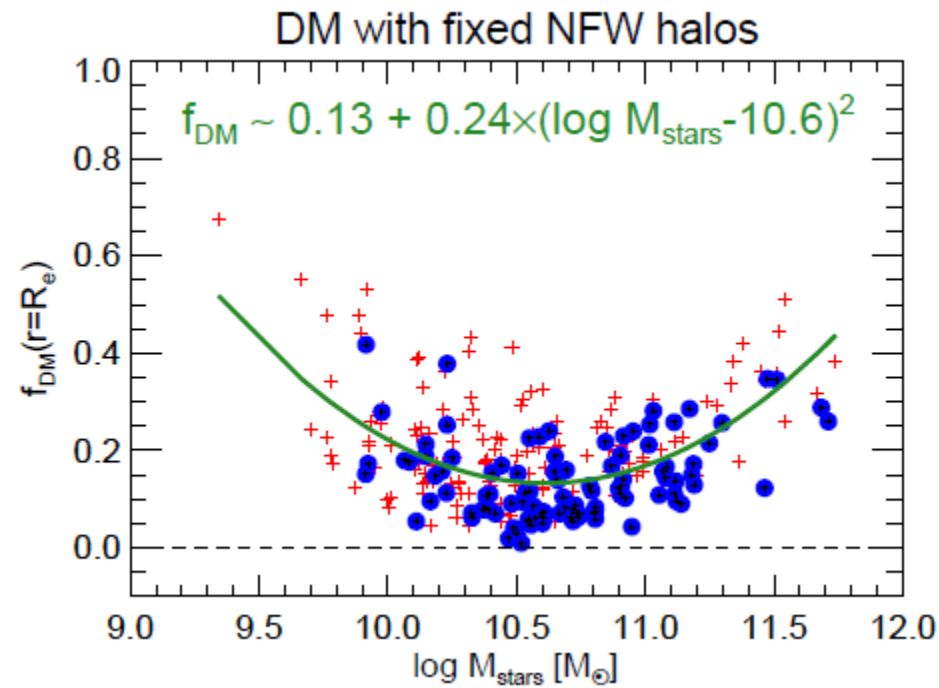
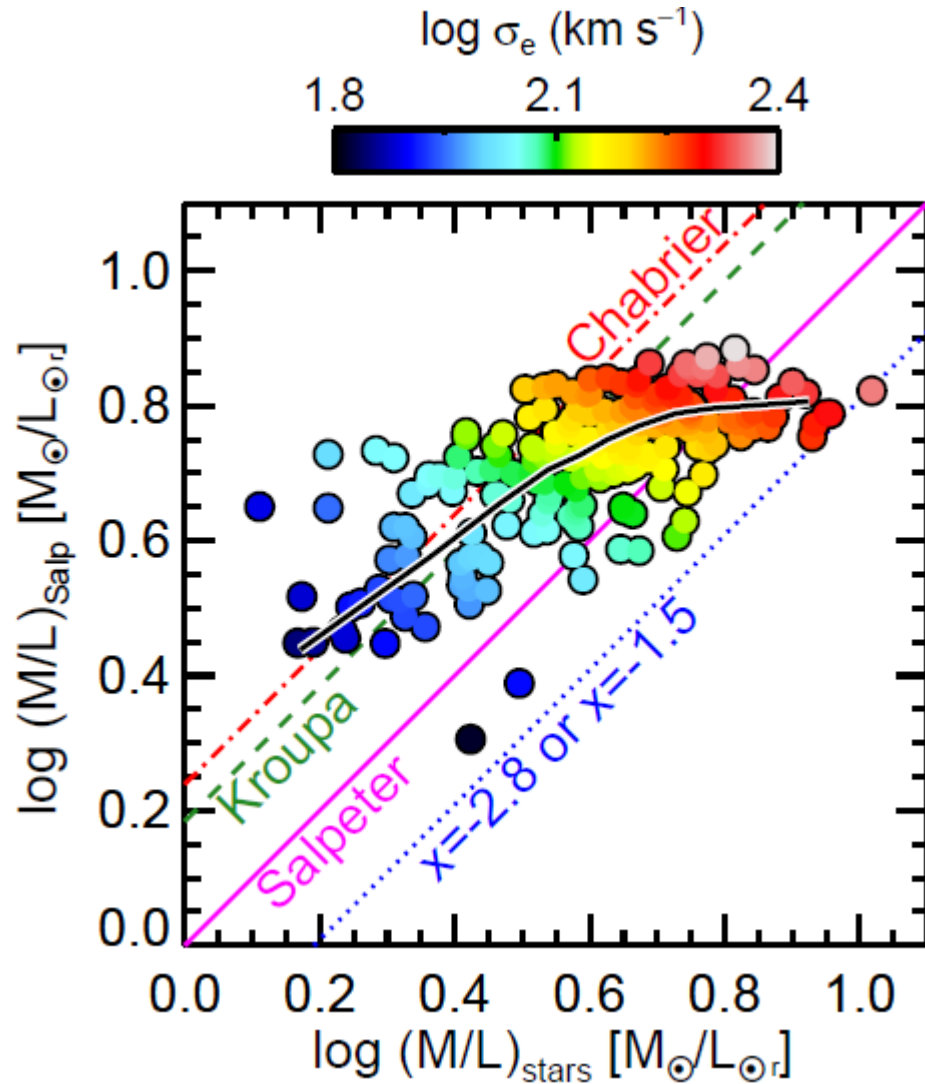


# IMF versus SF regime ?

- ~ Is there a link between SF regimes, environments and IMF?
- ~ Is it the SF regime which determines the IMF or does IMF constrain SF regimes/environments?

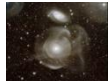
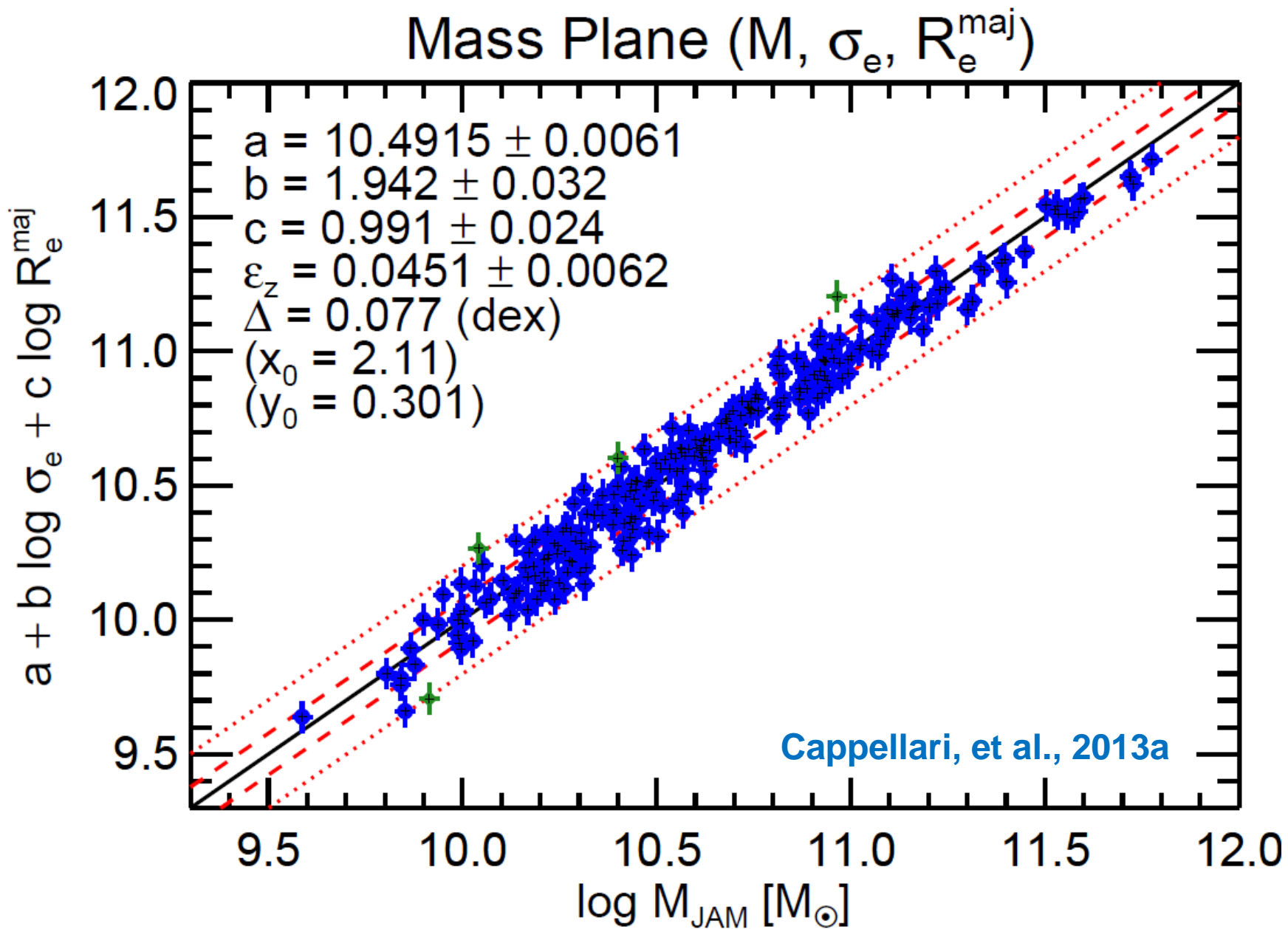


- ~ A link between these extreme environment and the IMF?
- ~ DM fraction versus M similar to Specific frequencies of GCs?





# SF : what is your calibrator ?



- ↷ **Importance of physical processes**
  - ↷ *What are the important ingredients ?*
  - ↷ *Is self-regulating or triggering important ?*
- ↷ **Importance of environments**
  - ↷ *Is that defining the on-going physics ?*
  - ↷ *Or is it just collateral damage ?*
- ↷ **Link with Existing systems**
  - ↷ *Which tracers ?*
  - ↷ *How do we disentangle the ingredients ?*
- ↷ **Perspectives ?**
  - ↷ *IMF studies : how to decide if relevant*
  - ↷ *High redshift : how to connect with low  $z$*
  - ↷ *Simulations : how to go beyond Zoology*

