Portoferraio, Isola d'Elba, Livorno (Italy), 8 – 12 September, 2008

Future Ground-Based Solar System Research

Joint Workshop of INAF/Arcetri and ESO

Synergies with Space Probes and Space Telescopes

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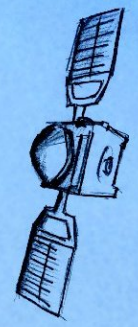

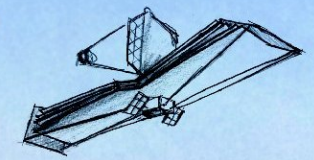

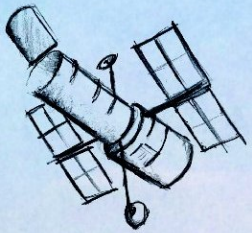

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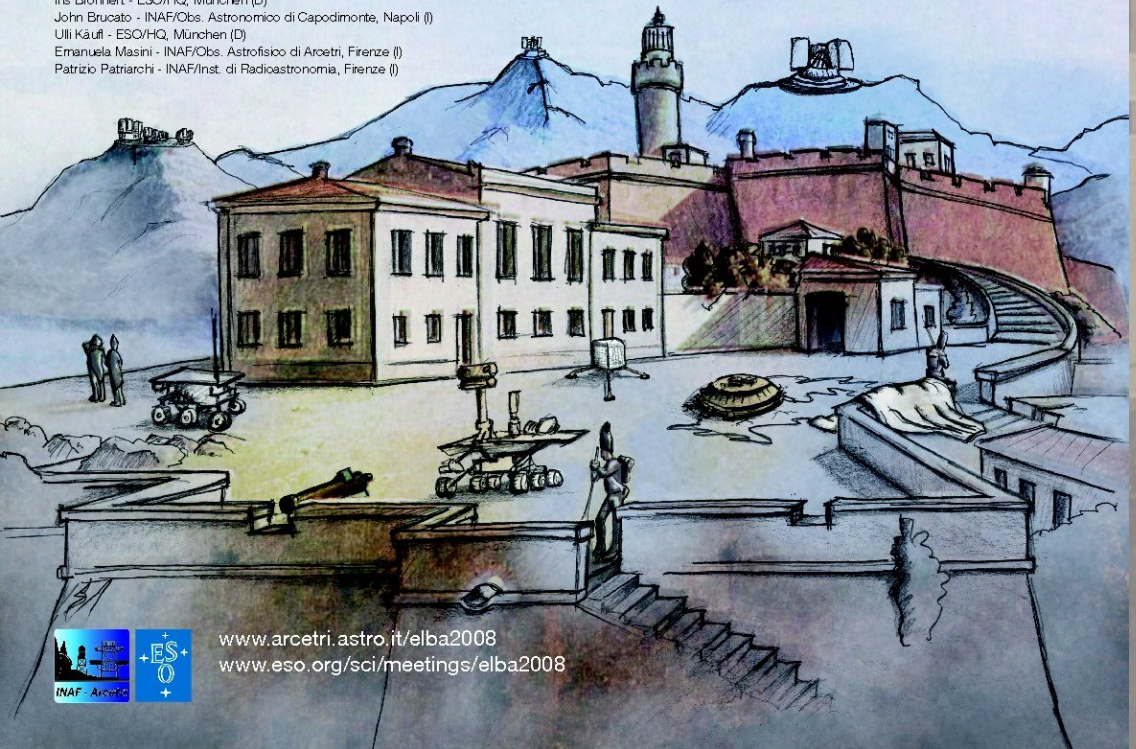

www.arcetri.astro.it/elba2008
www.eso.org/sci/meetings/elba2008

Summary Elba Workshop

- > 70 participants
- from Japan, Europe and North- and South America
- scientists associated with space probes & JWST
- user's of ground- and space telescopes for Solar system research
- researchers in extra-solar planets
- exo-biologists
- experts in planetary system formation
- theoreticians

5 day meeting with
a splinter session to form an E-ELT Solar System Working Group

Intention of Workshop

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- **What might be the Solar system observations shifting paradigms 10-15 years from now?**
- **What potential offer the λ / D and the D^4 gain of ELTs for the Solar system?**

How does the E-ELT and TMT fit in? some conclusions:

- **E-ELT instrumentation study largely in line with the requirements; METIS, SIMPLE, HARMONI & MICADO o.k.**
  expensive, risky or controversial instruments not called for by the Solar System community
- **High sensitivity and spatial resolution matter;**
  offered only by an E-ELT or TMT
- **Thermal IR, especially 60-100000 GHz (3-5μm) of outmost importance;**
  => high and dry site more than desirable;
  beef will be put to this by contributing to the DRSP
- **simultaneity matters, i.e. cross-dispersion beats integral field**
- **there were ideas / "requests for time" for at least 4 E-ELTs**
- **<u>clear requirement to the E-ELT:</u> differential tracking must be possible with un-compromised image quality**

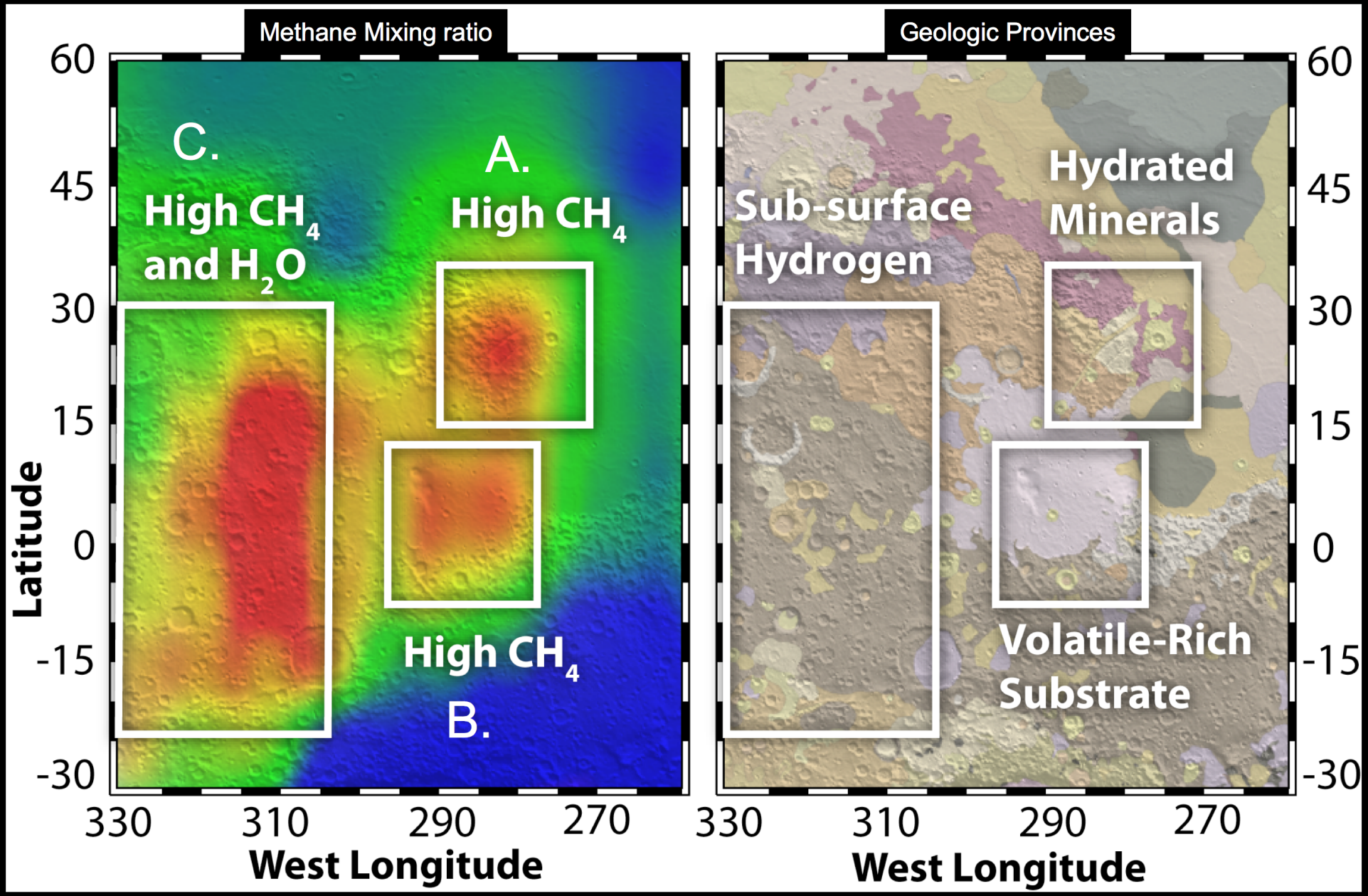
Two Potential Science Reference Cases:

- #1: Study of the inner coma of a representative sample of Kuiper-Belt and Oort-cloud comets; will be coordinated by Herrman Böhnhardt (MPI for Solar System Research, Lindau)
- #2: Understanding the Chemistry and Evolution of the Martian Atmosphere; will be coordinated by Therese Encrenaz (LESIA, Paris) and Mike Mumma (NASA-GSFC)
  - Why on Earth Mars?
  - Mars is a "Southern Hemisphere Object"
    => E-ELT / METIS can resolve atmospheric scale height when limb sounding; far beyond capabilities of any space craft
  - Mars atmosphere is extremely simple:
    - no liquid water or no plate tectonics
    but
    - preciously enigmatic: composition, photo-chemistry, stability ...
  - understanding Mars is fundamental for the case of Earth!

Villanueva, Mumma, and Novak, Science (submitted)

High-resolution spatial maps reveal local methane plumes :

A. Nili Fossae B. Syrtis Major volcano, S.E. quadrant) C. Ancient hydrated terrain



Follow-up

- **Some 15 participants have volunteered to form an E-ELT Solar System working group:**
  - **a task force will elaborate soon programs for the DRSP**
  - **conclusions and recommendations to ESO are drafted**

- **and we may have "infected" TMT**
  David Crampton: "*Solar System is surely important as at the HST only 2% of the observing time go into Solar system, but it is good for 30% of the publicity*"

- **There might be another scientific meeting in a few years with this community and program?**


DON'T PANIC