Oxidative Potential of PM obtained at T0 and T1: An evaluation by EPR and DNA degradation.

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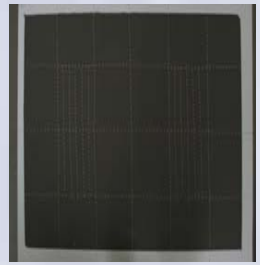
Objective

- Influence impact on the proxidative characteristics of PM_{10} and $PM_{2.5}$ samples of “T0” and “T1”, by Electronic Paramagnetic Resonance and correlation with DNA degradation.

METHODS

T0



T1

PM_{10} and $PM_{2.5}$ collected in "T0" and "T1"

Samples recovered

EPR → **Dry** (Paramagnetic species) → **DMPO** (Oxidative potential)

DNA → **Degradation** Isolated DNA damage

DTT → **REDOX Activity**

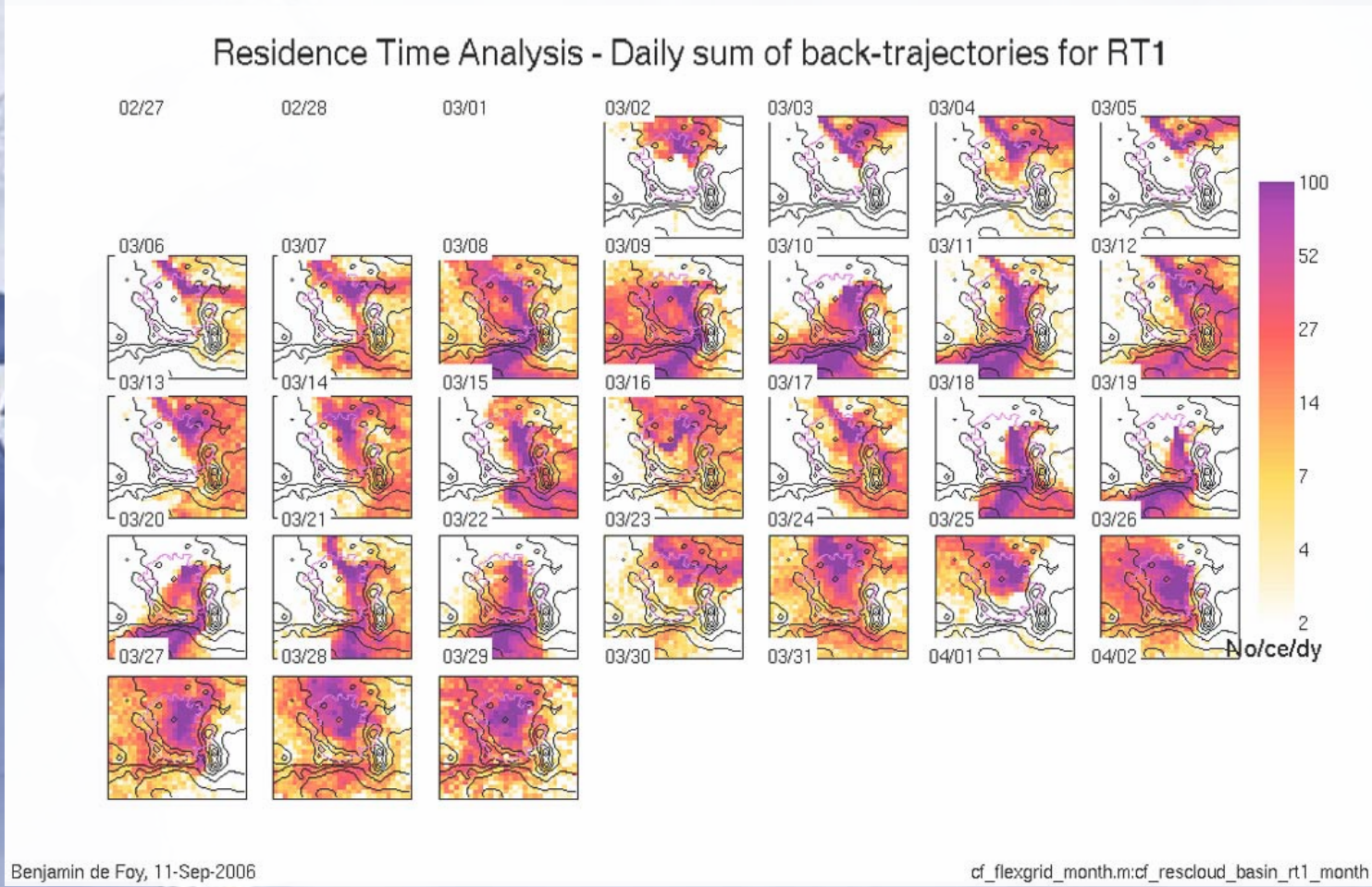
ROS → **Production Intracellular**

HEMOLYSIS → **Erythrocytes Disruption**

Metals → **PIXE** → **ICP-MS** (Plasma mass Spectrometry)

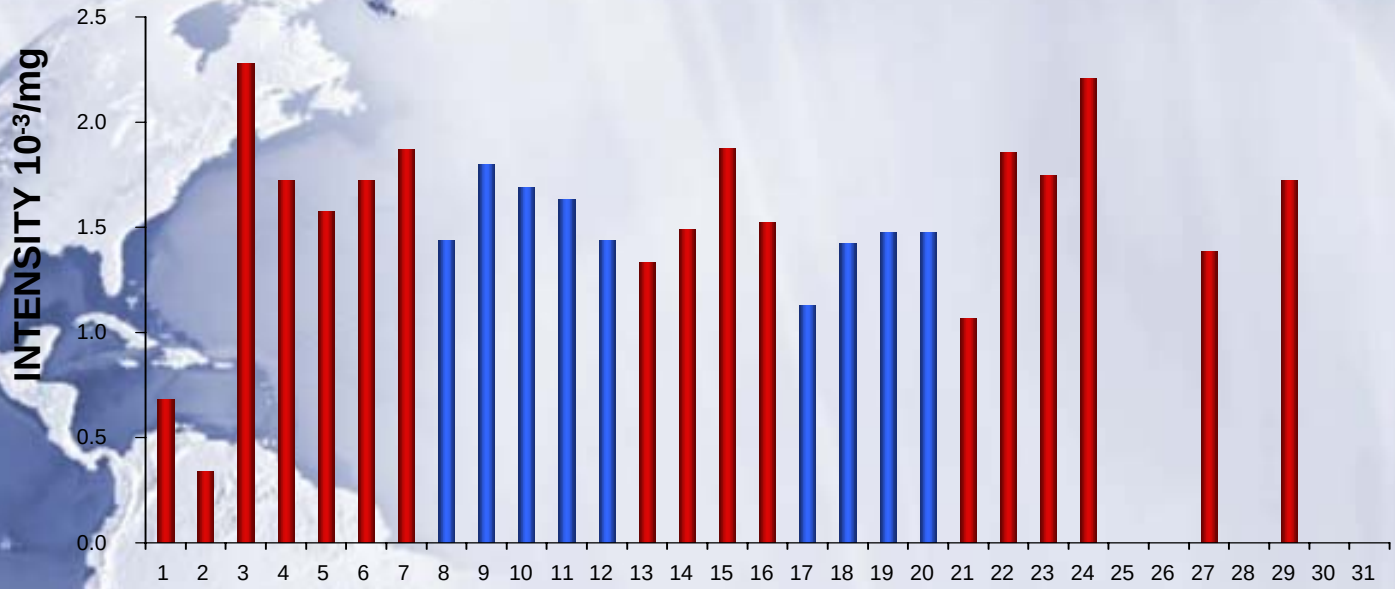
Carbon (OC & EC) → **TOR** (Thermal Optical Carbon Analyzer)

Back-trajectories of “T1”



- Influence days are when there was impact of the urban zone (T0) over T1 from march 8 to 13 (Influence period 1) and from march 17 to 20 (Influence period 2).

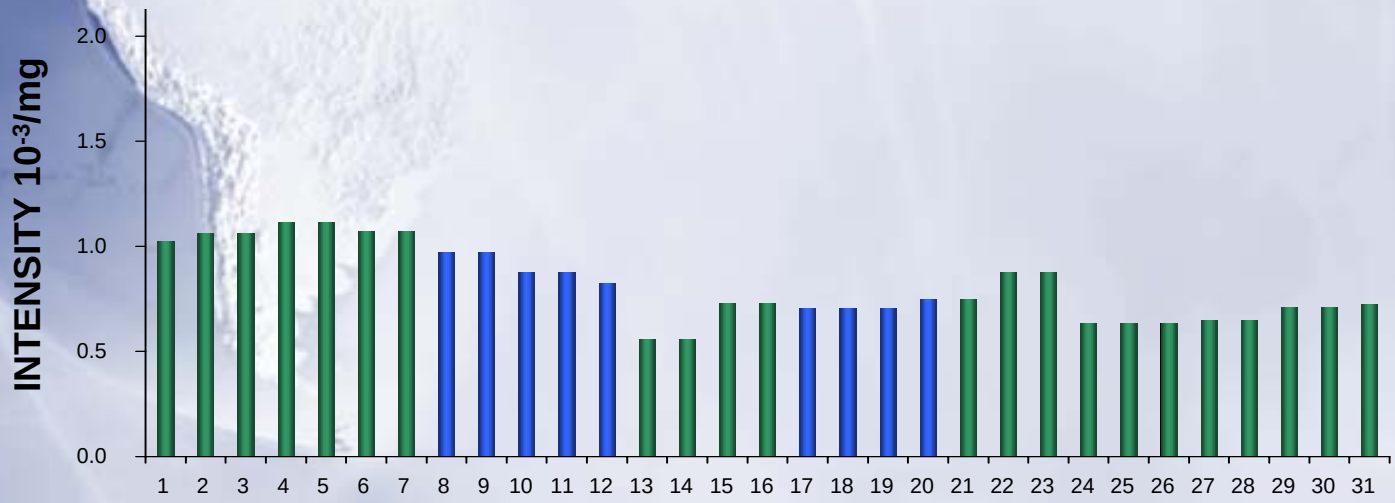
EPR
PARAMAGNETIC SPECIES OF METALS PRESENT IN PM_{10} SAMPLES FROM "T0" AND T1 BY INFLUENCE



"T0"

NO INFLUENCE

INFLUENCE



"T1"

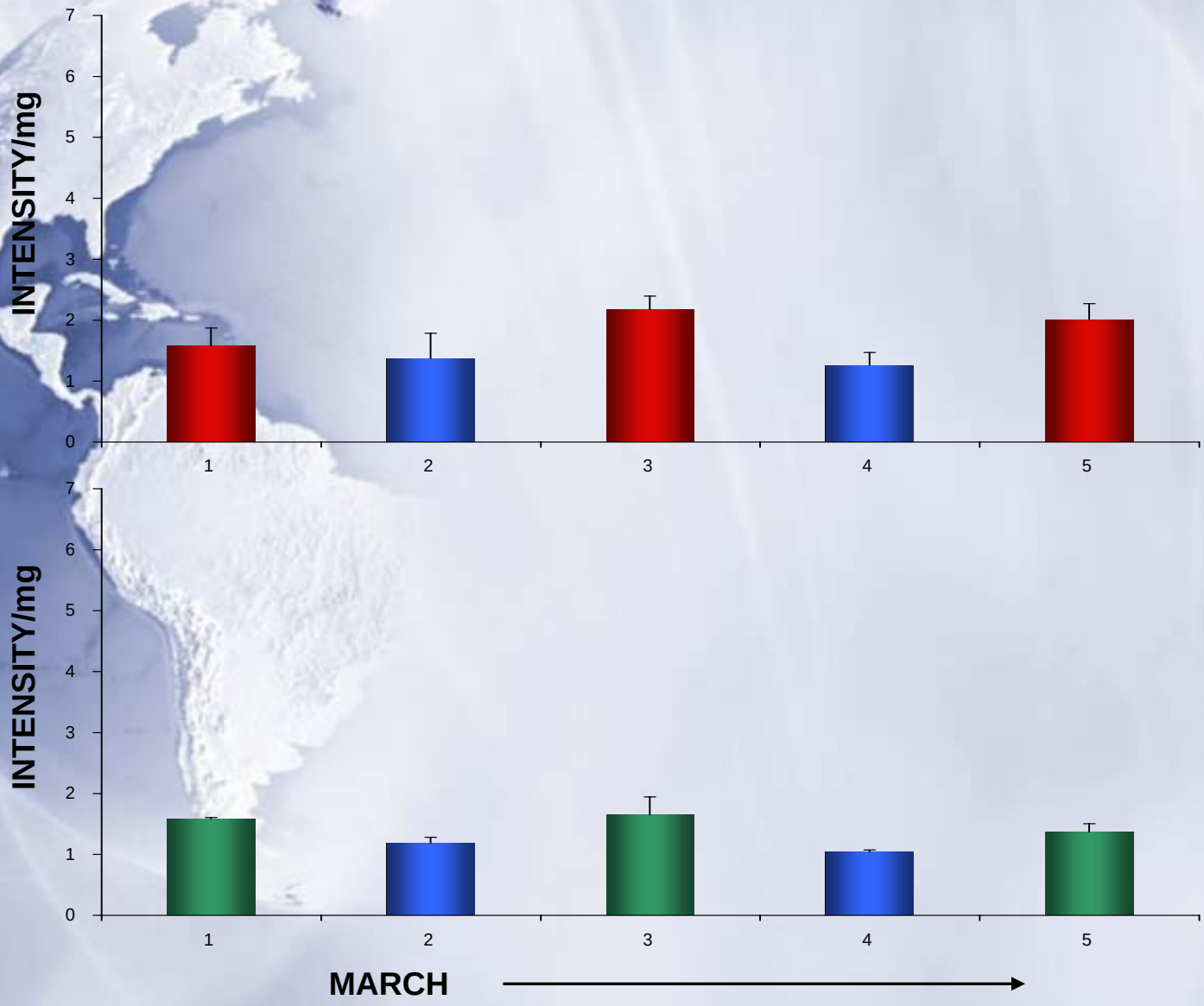
NO INFLUENCE

INFLUENCE

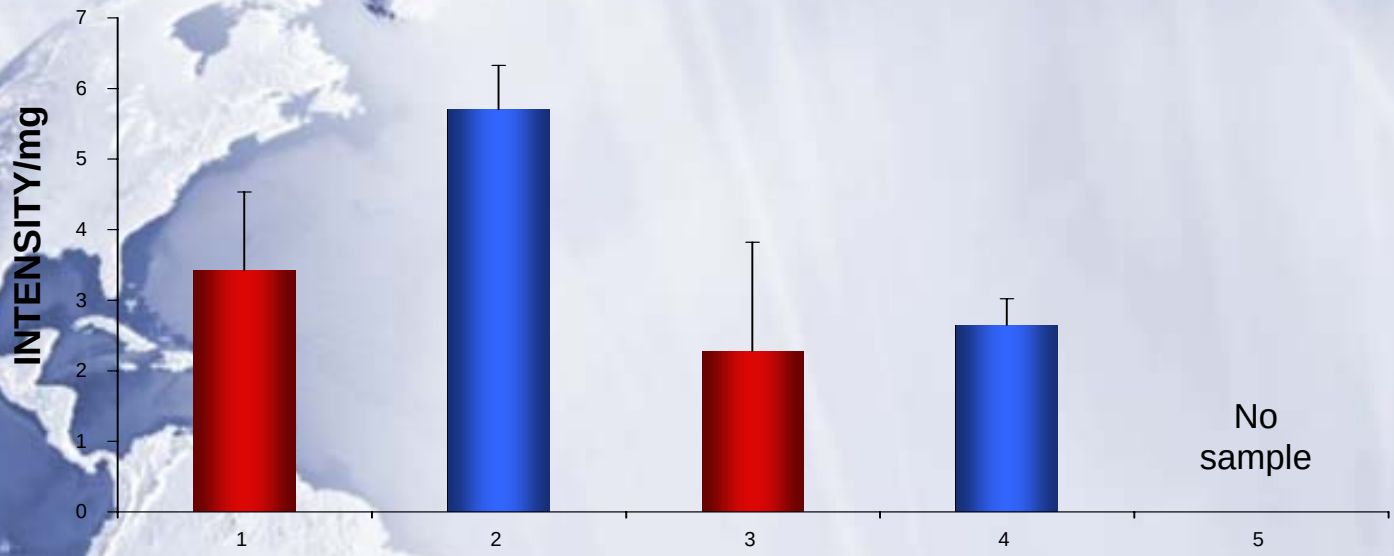
EPR CONCLUSIONS

- We found daily variability.
- We didn't find differences in the two influences periods.
- “T0” presents more paramagnetic species than “T1”.

EPR + DMPO
EVALUATION OF OH• GENERATION WITH H_2O_2 BY PM_{10}
SAMPLES FROM "T0" AND "T1" POOLED BY INFLUENCE



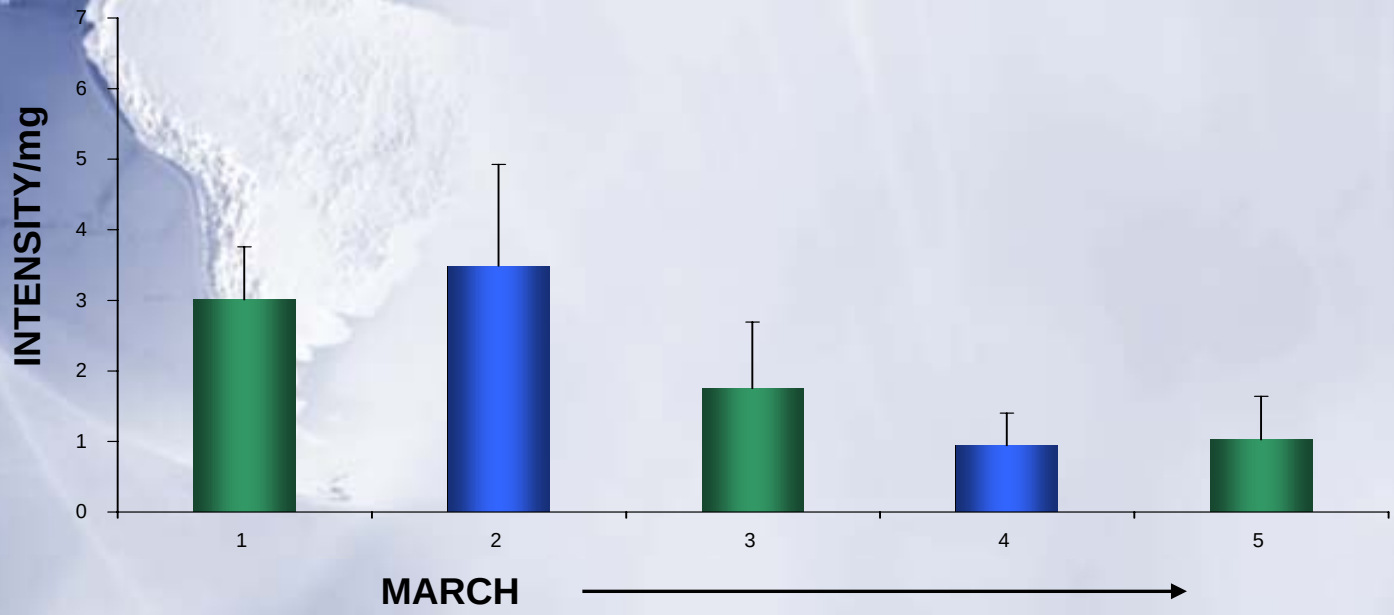
EPR + DMPO
EVALUATION OF OH• GENERATION WITH H_2O_2 BY $PM_{2.5}$
SAMPLES FROM "T0" AND "T1" POOLED BY INFLUENCE



"T0"

NO INFLUENCE

INFLUENCE



"T1"

NO INFLUENCE

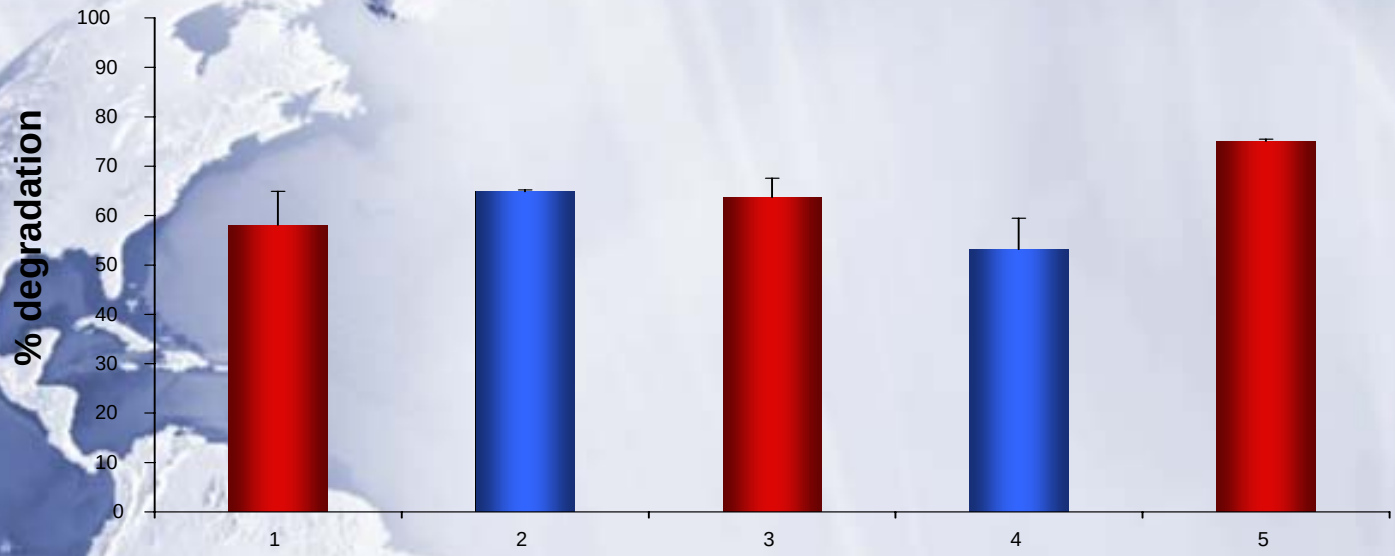
INFLUENCE

DMPO CONCLUSIONS

- Existed more oxidative potential for $PM_{2.5}$ than PM_{10}, and is bigger in “T0” than “T1”.
- Influences periods present lower sign for PM_{10}, and for $PM_{2.5}$ the first influence period increase the signal and the second influence period decrease it.

DNA

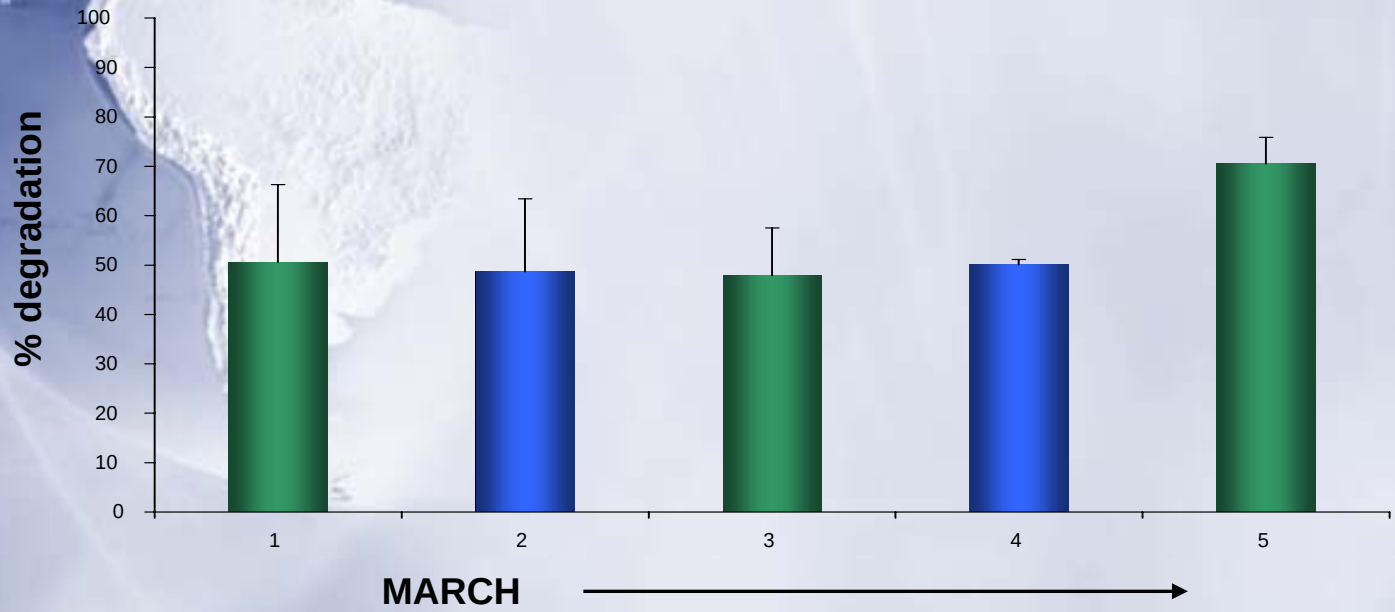
DEGRADATION BY 80 μg/mL PM_{10} SAMPLES FROM "T0" AND "T1" POOLED BY INFLUENCE



"T0"

NO INFLUENCE

INFLUENCE



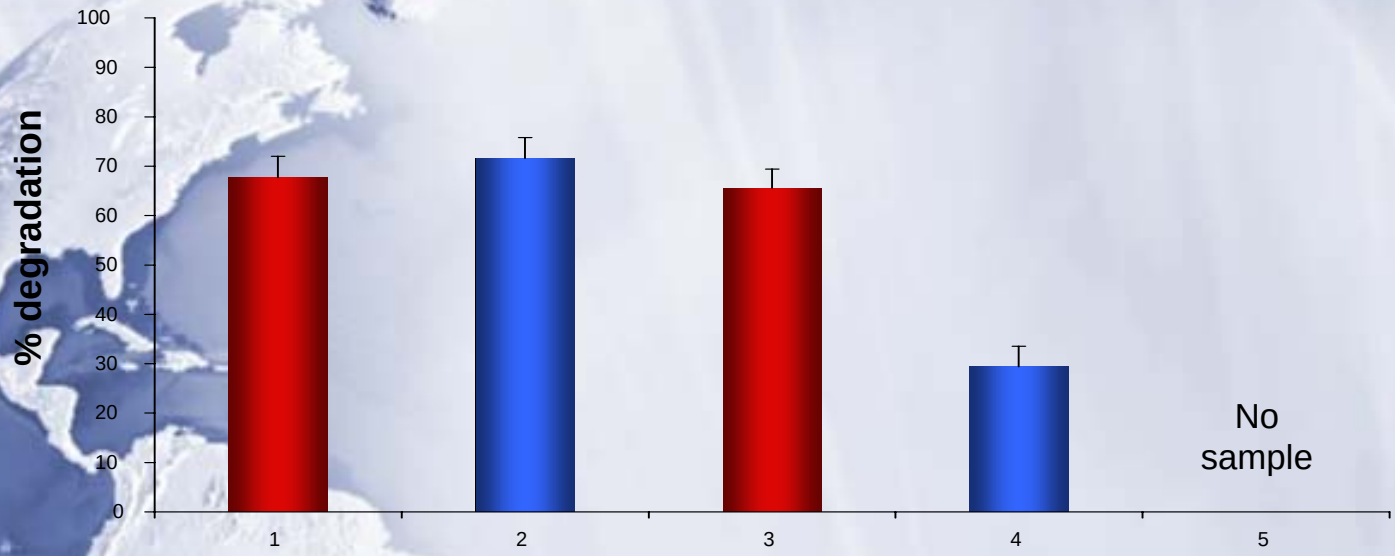
"T1"

NO INFLUENCE

INFLUENCE

DNA

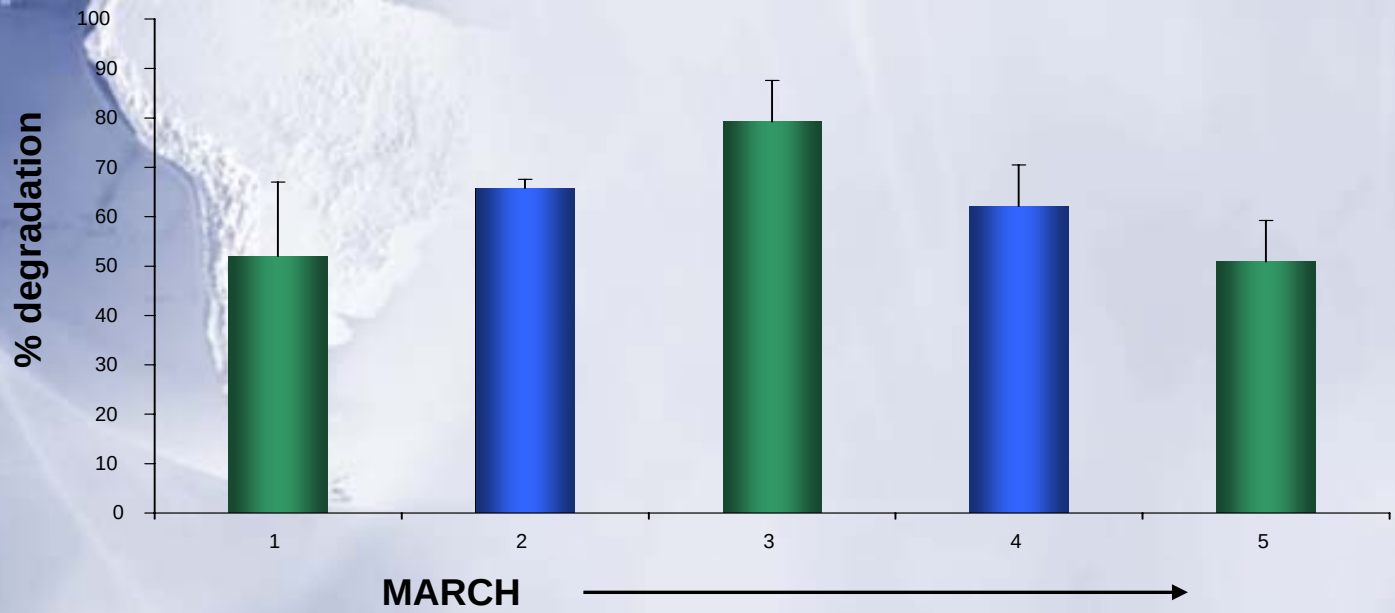
DEGRADATION BY 80 μg/mL $PM_{2.5}$ SAMPLES FROM "T0" AND "T1" POOLED BY INFLUENCE



"T0"

NO INFLUENCE

INFLUENCE



"T1"

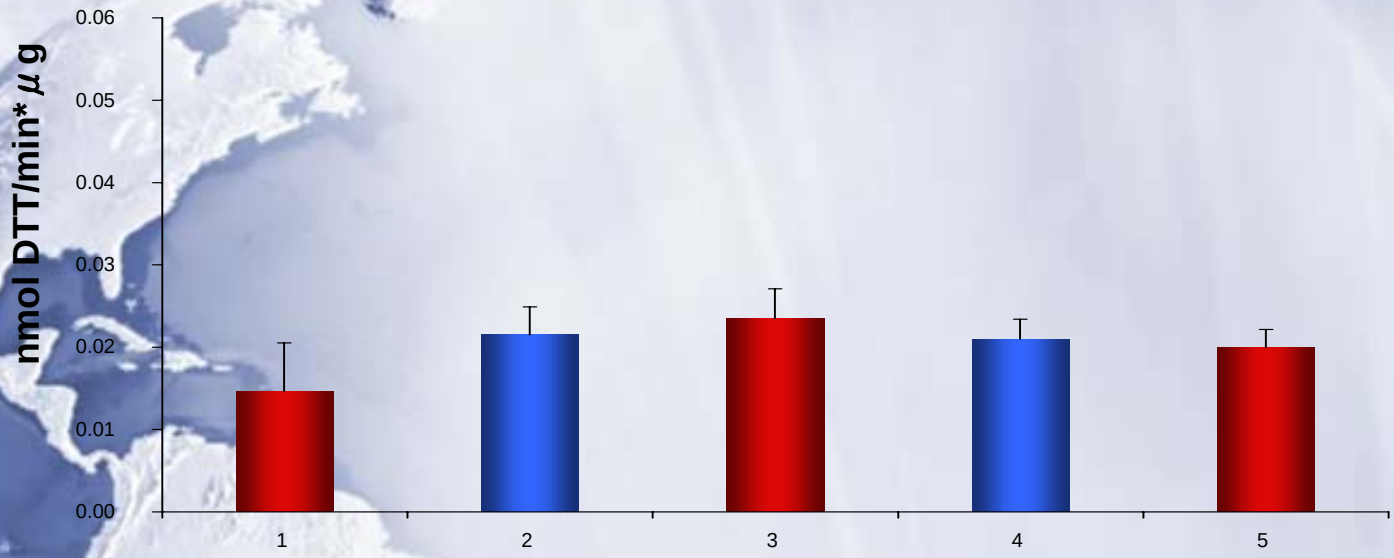
NO INFLUENCE

INFLUENCE

DNA CONCLUSIONS

- All the samples produce DNA degradation.
- $PM_{2.5}$ induces more DNA degradation than PM_{10}.
- “T0” produces higher DNA degradation than “T1”.
- PM_{10} have no influence effect because they can not displace so long comparing with $PM_{2.5}$ where influence period 1 increase our effects.

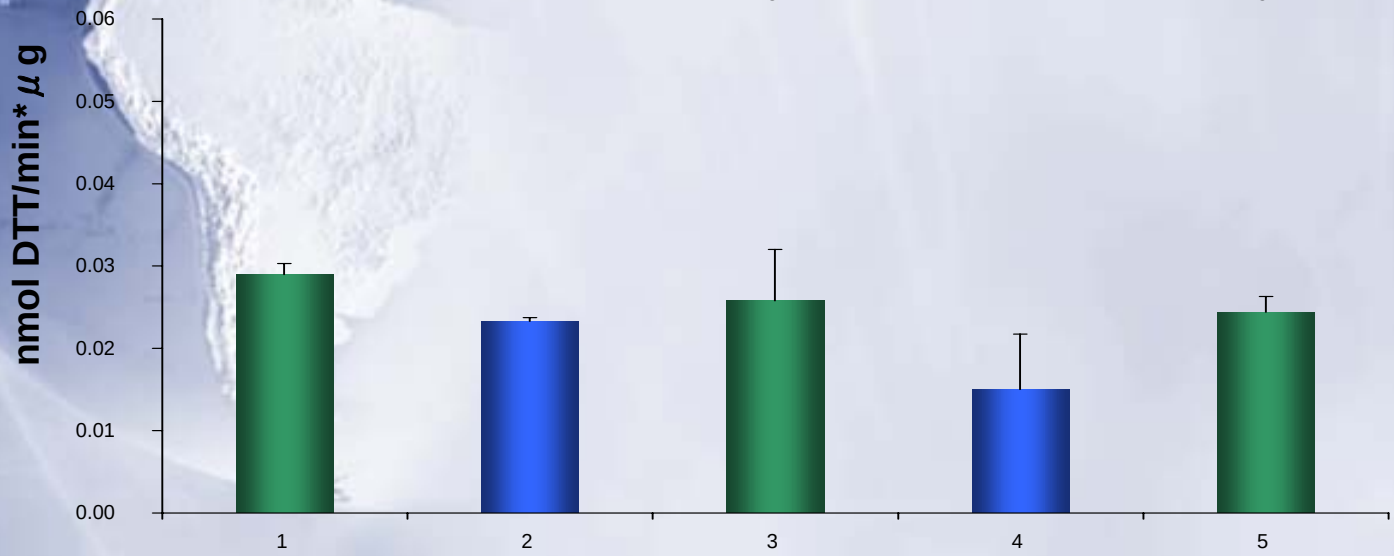
DTT
REDOX ACTIVITY OF PM_{10} SAMPLES FROM "T0" AND "T1"
OH• GENERATION WITHOUT H_2O_2



"T0"

NO INFLUENCE

INFLUENCE



"T1"

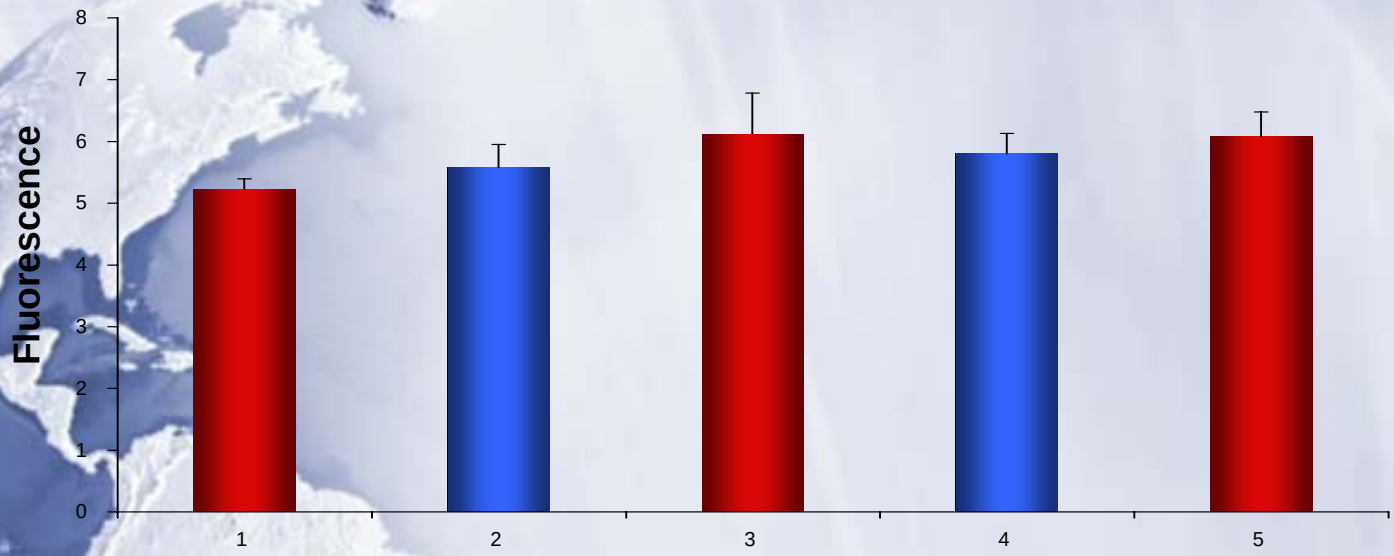
NO INFLUENCE

INFLUENCE

MARCH

ROS

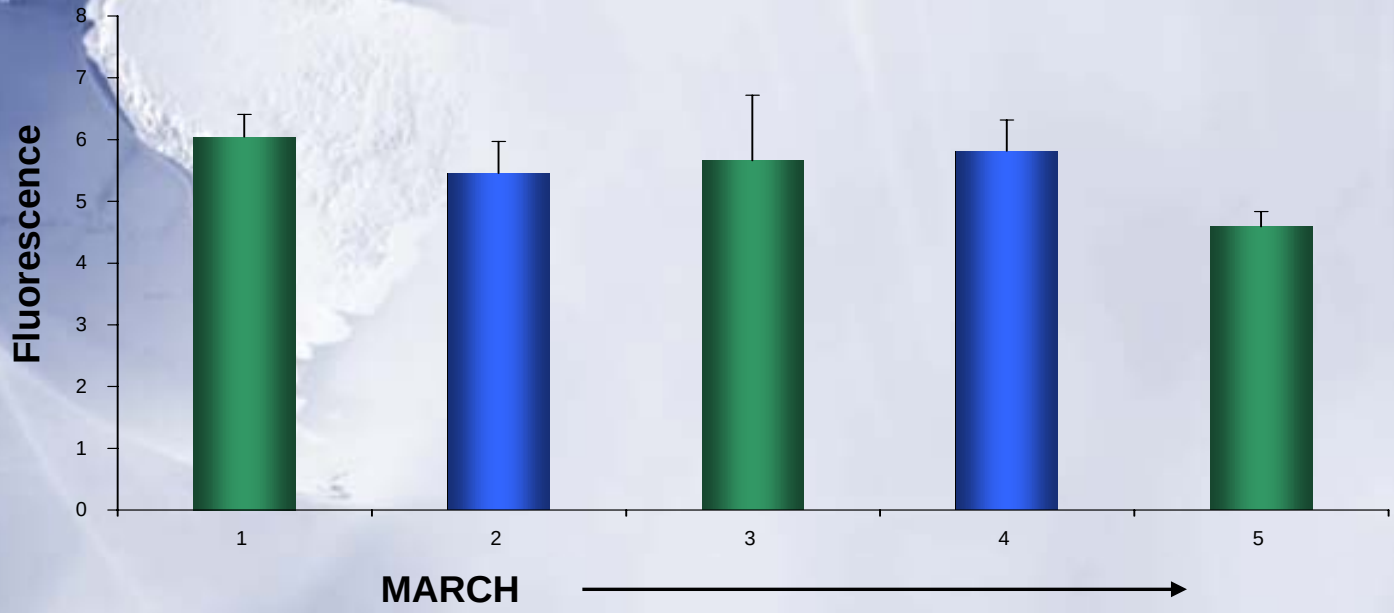
In vitro PRODUCTION OF INTRACELLUAR ROS IN LUNG EPITHELIAL CELLS EXPOSED TO PM_{10} SAMPLES FROM "T0" AND "T1"



"T0"

NO INFLUENCE

INFLUENCE



"T1"

NO INFLUENCE

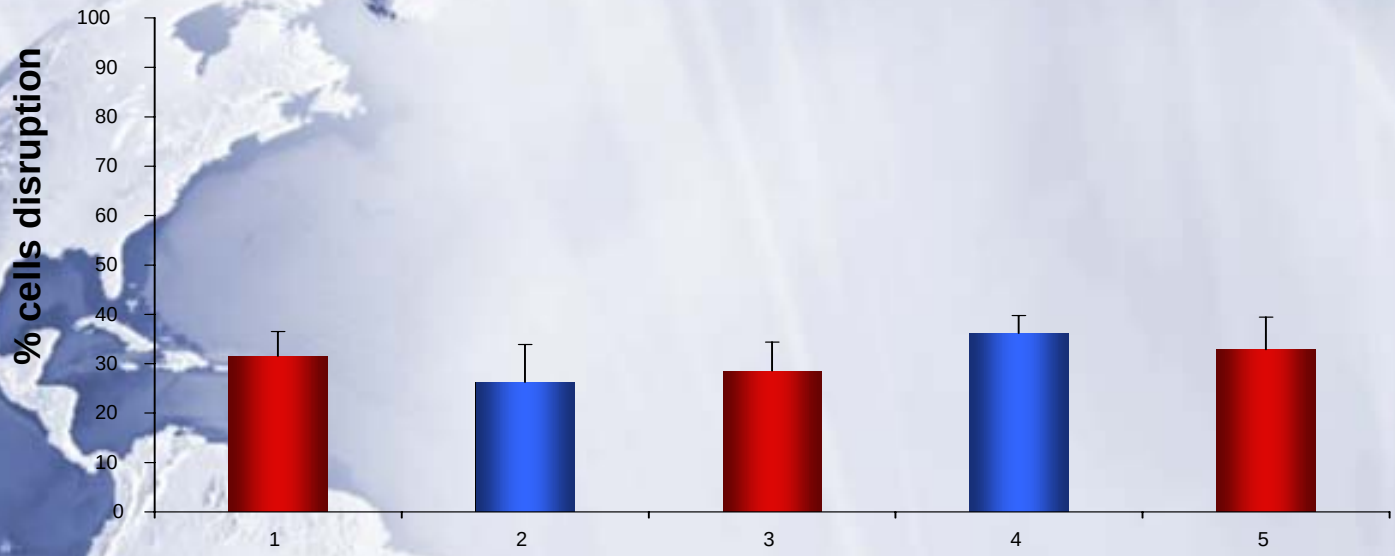
INFLUENCE

ROS CONCLUSIONS

- PMs generated reactive species.
- Cells can not detect the differences between influences periods.
- We can not found differences between “T0” and “T1”, neither between PM_{10} and $PM_{2.5}$.

HEMOLYSIS

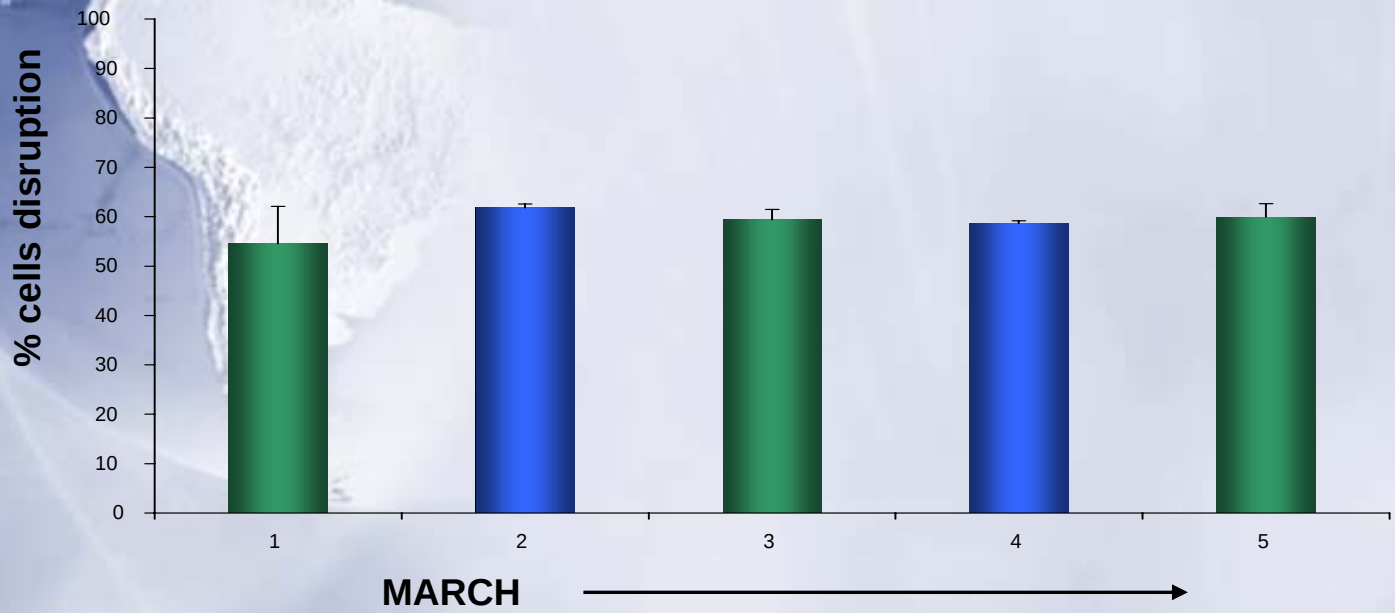
INDUCTION OF *in vitro* ERYTHROCYTES DISRUPTION BY 80 μg/mL PM_{10} SAMPLES FROM "T0" AND "T1"



"T0"

NO INFLUENCE

INFLUENCE



"T1"

NO INFLUENCE

INFLUENCE

HEMOLYSIS CONCLUSIONS

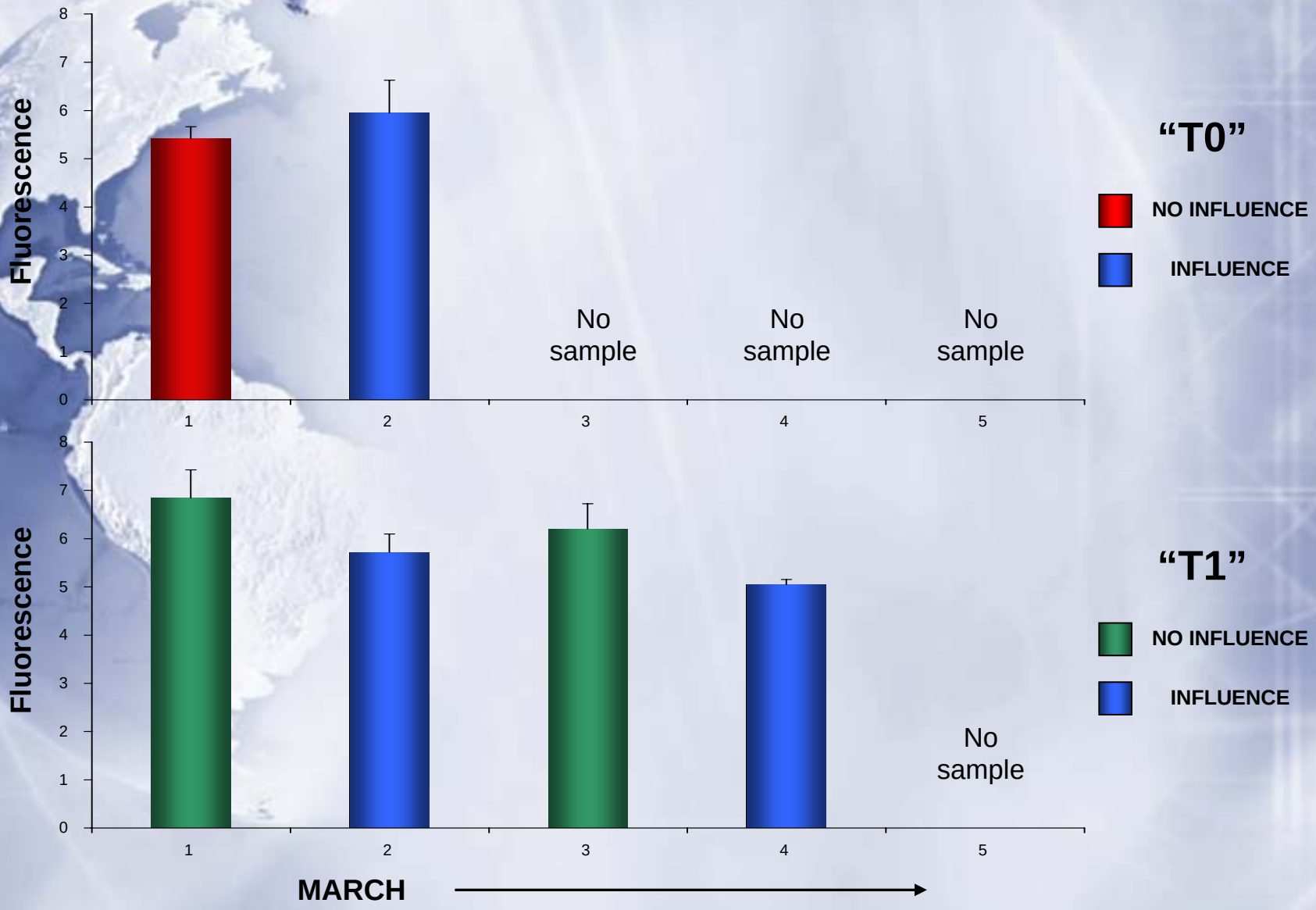
- PMs generated hemolysis.
- Cells can not detect the differences between influences periods.
- We found differences between “T0” and “T1”, being higher for “T1”.
- These results can be explained for the soil presence in the samples, because previous studies showed than PMs with a lot of soil contained produce hemolysis.

CONCLUSIONS

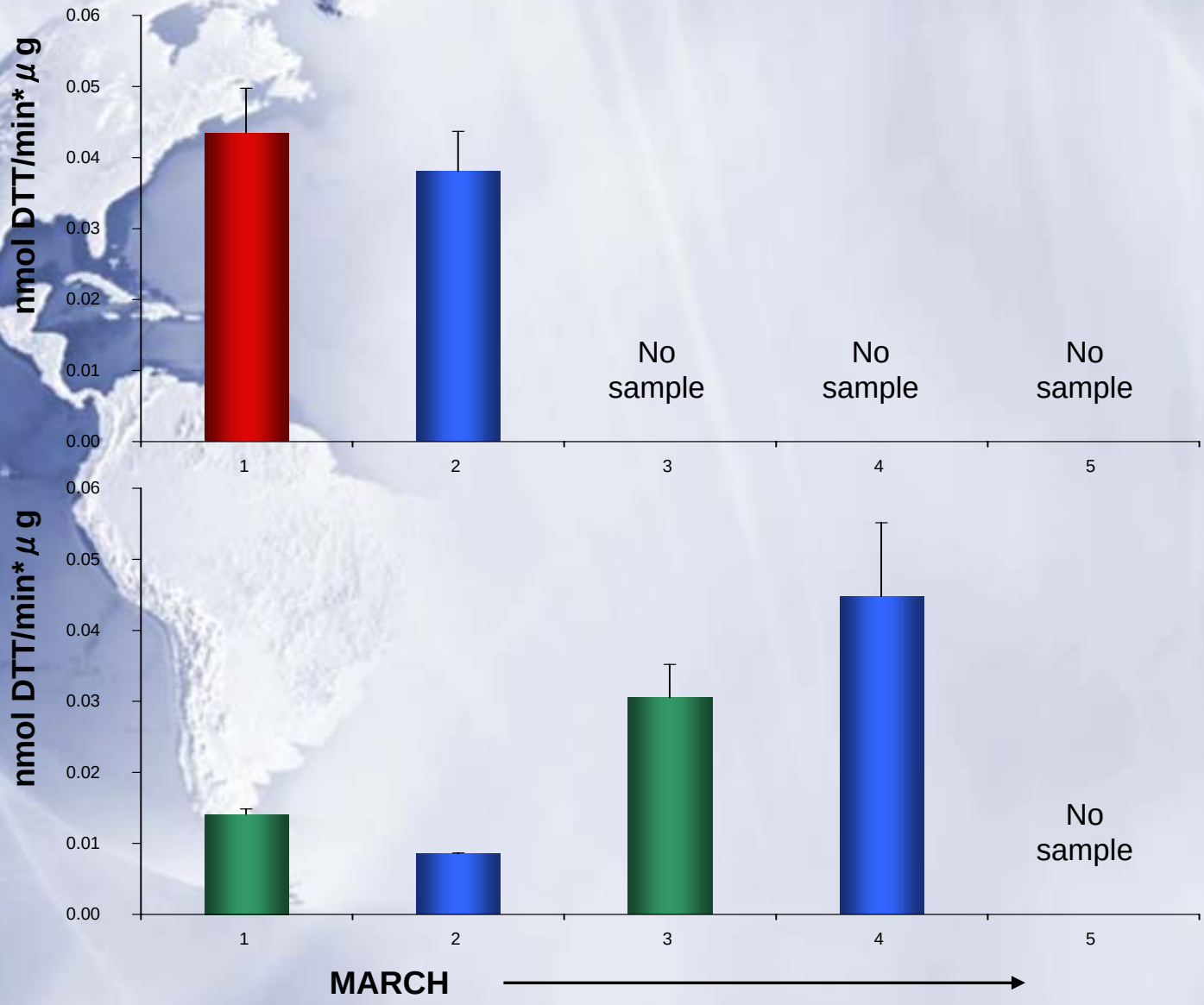
- The back trajectories wind graphics let us to obtain two influence periods from “T0” to “T1”, with these patterns the PMs pools were made.
- We found differences in the paramagnetic species concentration between the influences periods and non influence periods, such as daily variability.
- We determinate that $PM_{2.5}$ have more oxidative potential than PM_{10}, as well as “T0” bigger than “T1”.
- We still have to do the correlations and statistic analyses.
- We are still waiting for the metals analyses.

ROS

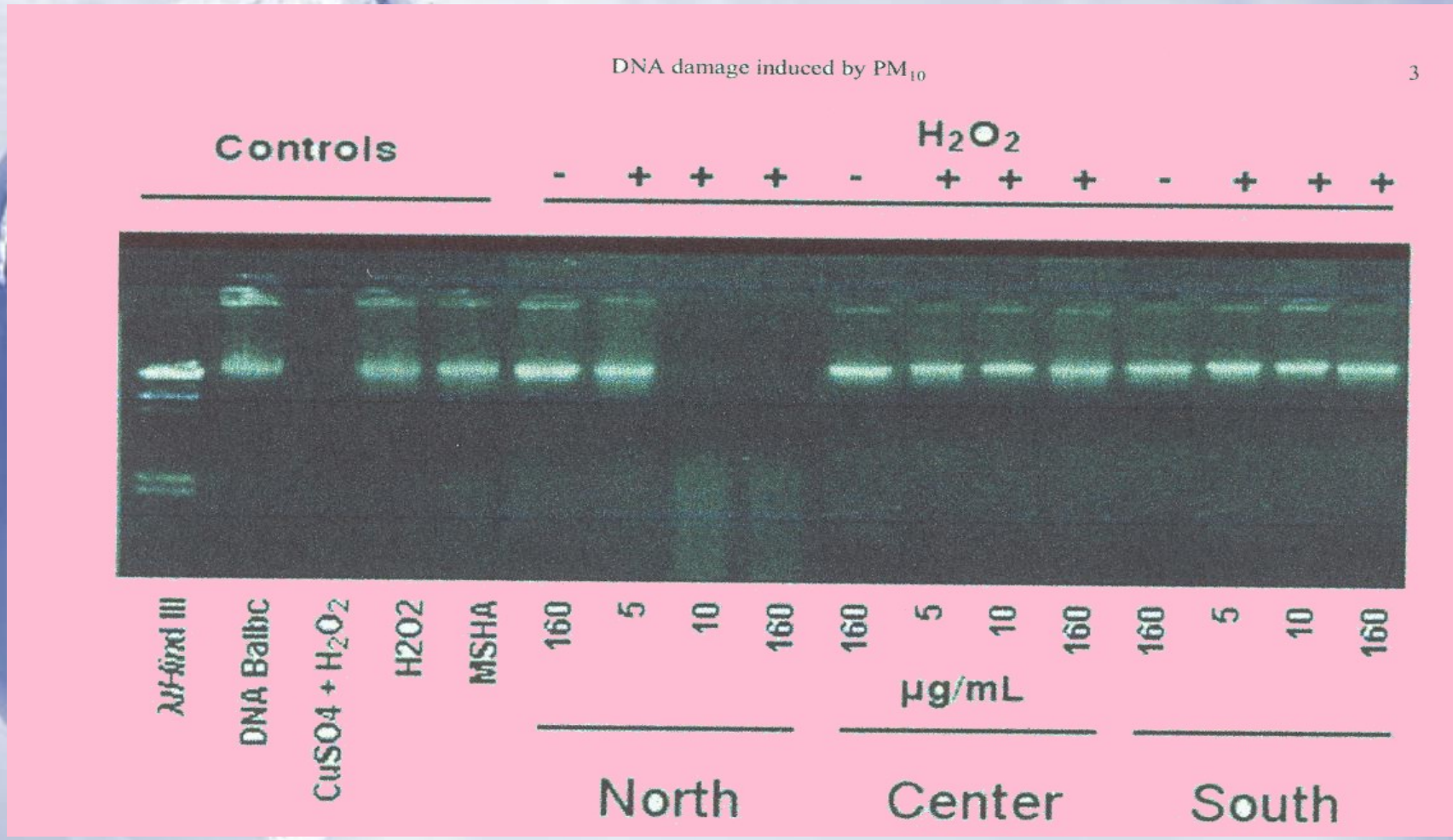
In vitro PRODUCTION OF INTRACELLUAR ROS IN LUNG EPITHELIAL CELLS EXPOSED TO $PM_{2.5}$ SAMPLES FROM “T0” AND “T1”



DTT
REDOX ACTIVITY OF $PM_{2.5}$ SAMPLES FROM "T0" AND "T1"
OH• GENERATION WITHOUT H_2O_2



EXPOSICIÓN DEL DNA CON LAS PARTÍCULAS PM_{10}



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