**Supplementary Material - OxCal codes**

**OxCal CODE 1: Sedimentary deposition model for the Lagoa Salgada based on calibration of Blanco (2014) and Cruz et al. (2019) published raw data (SED). Calibration was made using Marine20 curve (Heaton et al., 2020) and OxCal v4.4.4 software (Bronk Ramsey 2021).**

// Delta\_R values updated for Marine20

Plot()

{

Curve("Marine20","marine20.14c");

Outlier\_Model("General",T(5),U(0,4),"t");

Delta\_R("DR", U(-400,100));

U\_Sequence("S15")

{

Boundary("I-A");

R\_Date("SED-16",5940,110)

{

Outlier(0.05);

z=2.10;

};

Boundary ("I-B");

R\_Date("SED-15",4034,44)

{

Outlier(0.05);

z=1.96;

};

R\_Date("SED-14",3952,44)

{

Outlier(0.05);

z=1.66;

};

R\_Date("SED-13",4341,45)

{

Outlier(0.05);

z=1.50;

};

Boundary ("I-C");

R\_Date("SED-12",3817,44)

{

Outlier(0.05);

z=1.38;

};

R\_Date("SED-11",3634,44)

{

Outlier(0.05);

z=1.28;

};

R\_Date("SED-10",3824,44)

{

Outlier(0.05);

z=1.10;

};

R\_Date("SED-9",3440,43)

{

Outlier(0.05);

z=0.92;

};

R\_Date("SED-8",3464,43)

{

Outlier(0.05);

z=0.82;

};

Boundary ("II-D");

R\_Date("SED-7",3832,44)

{

Outlier(0.05);

z=0.72;

};

Boundary("II-E");

R\_Date("SED-6",3601,44)

{

Outlier(0.05);

z=0.56;

};

R\_Date("SED-5",3576,43)

{

Outlier(0.05);

z=0.38;

};

Boudary("III");

R\_Date("SED-4",3161,43)

{

Outlier(0.05);

z=0.30;

};

R\_Date("SED-3",3582,44)

{

Outlier(0.05);

z=0.22;

};

R\_Date("SED-2",3140,30)

{

Outlier(0.05);

z=0.16;

};

R\_Date("SED-1",2750,30)

{

Outlier(0.05);

z=0.12;

};

Boundary();

};

};

**OxCal CODE 2: Stromatolite growth model based on Bahniuk (2013) radiocarbon dated samples (STM1). Calibration was made using Marine20 curve (Heaton et al., 2020) and OxCal v4.4.4 software (Bronk Ramsey 2021).**

// Delta\_R values updated for Marine20

Plot()

{

Curve("Marine20","marine20.14c");

Delta\_R("DR", U(-400,100));

Outlier\_Model("General",T(5),U(0,4),"t");

Sequence("Estromatolito")

{

Boundary("Camada 1");

R\_Date("STM1-1",2222,109)

{

Outlier(0.05);

};

Boundary("Camada 2");

R\_Date("STM1-2",2306,96)

{

Outlier(0.05);

};

Boundary("Camada 3");

R\_Date("STM1-3",1982,91)

{

Outlier(0.05);

};

Boundary("Camada 4");

R\_Date("STM1-4",1128,100)

{

Outlier(0.05);

};

Boundary("Camada 5");

R\_Date("STM1-5",592,95)

{

Outlier(0.05);

};

Boundary("Camada 6");

R\_Date("STM1-6",260,99);

{

Outlier(0.05);

};

Boundary();

};

};

**OxCal CODE 3: Stromatolite growth model based on Coimbra et al. (2000) radiocarbon dated samples (STM2). Calibration was made using Marine20 curve (Heaton et al., 2020) and OxCal v4.4.4 software (Bronk Ramsey 2021).**

// Delta\_R values updated for Marine20

Plot()

{

Curve("Marine20","marine20.14c");

Delta\_R("DR", U(-400,100));

Outlier\_Model("General",T(5),U(0,4),"t");

Sequence("Estromatolito")

{

Boundary("Camada 1- Bottom");

R\_Date("STM2-1",2260,80)

{

Outlier(0.05);

};

Boundary("Camada 2");

R\_Date("STM2-2",1800,80)

{

Outlier(0.05);

};

Boundary("Camada 3");

R\_Date("STM2-3",1560,80)

{

Outlier(0.05);

};

Boundary("Camada 4");

R\_Date("STM2-4",1160,80)

{

Outlier(0.05);

};

Boundary("Camada 5 - Top");

R\_Date("STM2-5",290,80)

{

Outlier(0.05);

};

Boundary();

};

};